



VOL. XXXII.

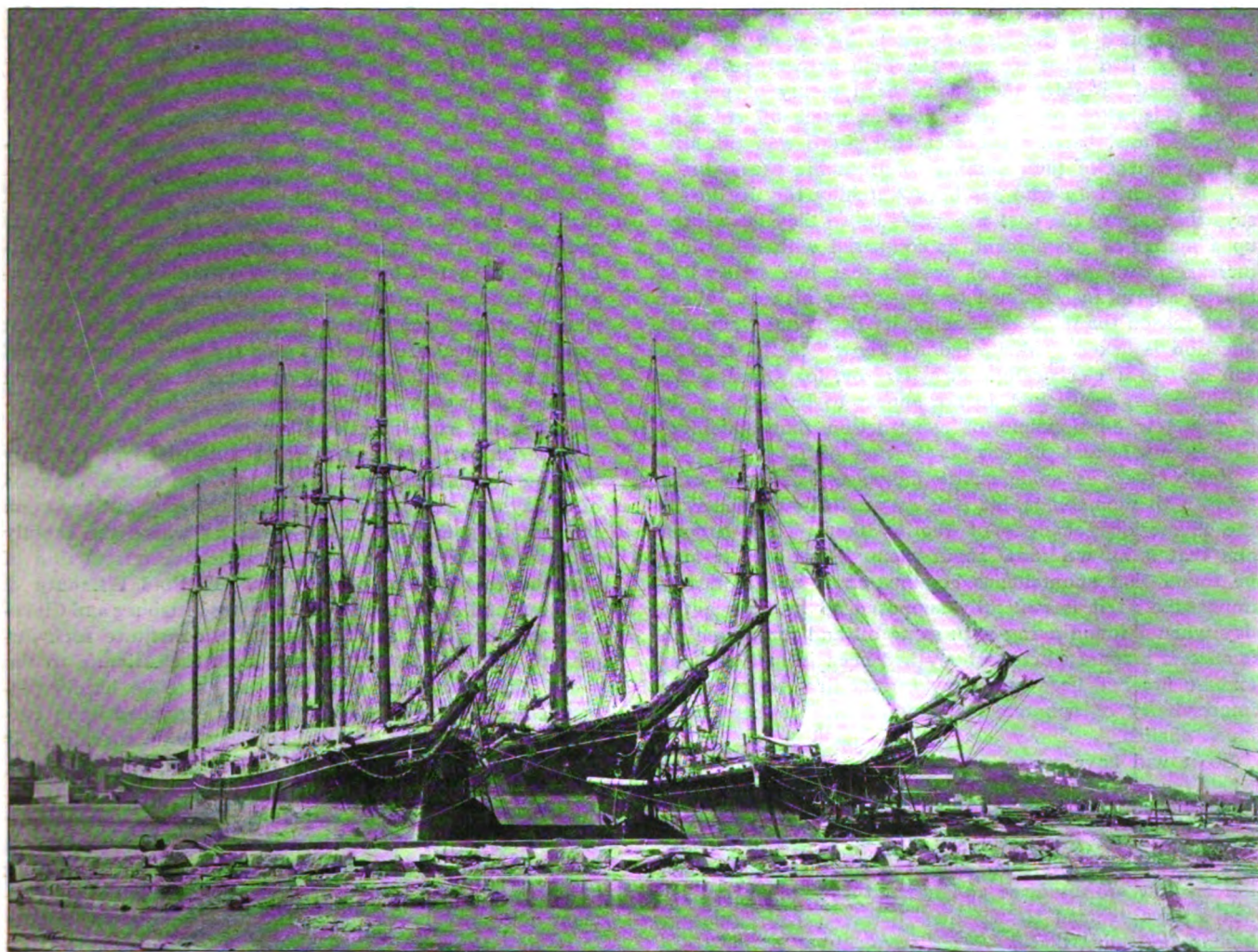
CLEVELAND, SEPTEMBER 28, 1905.

No. 13.

CYCLES IN VESSEL LOSSES

Buffalo, Sept. 26.—There are many odd circles in all sorts of business in which things seem to revolve at

ment than in another. For awhile it was in lumber, so that the insurance companies became afraid of lumber risks and many of them would not write one. Of late



MAINE'S "HEARTS OF OAK."

[Copyrighted, 1905, by Detroit Publishing Co.]

times. Sometimes it is one circle, sometimes it is another. The lake trade is full of the same sort of peculiar ways. Losses are always much larger some years in one depart-

lumber has escaped the average amount of disaster and some money has been made on it by the companies. The great storm on Lake Superior at the beginning of Sep-

tember caught a lot of lumber-laden vessels and there was anxiety at many lower-lake ports on account of them, for it is getting to be very hard to replace a cargo of lumber now and nobody is satisfied to sell it to the insurance companies, as the phrase goes.

But somehow the lumber cargoes came through safely, though more than one captain told his consignee when he arrived that he had his doubts at one time about the matter. The storm struck with all its fury at iron ore and several good craft went down with it. Scarcely any other freight was touched. Coal escaped, and yet more than one cargo has suffered since that time. Some whole seasons pass with scarcely any loss of coal cargoes, and rates are so low that a single good-sized total loss would make a big hole in the insurance earnings.

Of late it is fires that have struck the lake fleet hardest, that is, in comparison with the average. In a couple of weeks or so we have lost the former steamers V. H. Ketchum and G. W. Roby, and the Canadian steamer Melbourne by fire. Of course the first two are now only the ghosts of their former fair selves, for the moving spirit of the Ketchum is now in the steamer England, and that of the Roby is shoving the new steamer F. L. Robbins through the water. The Melbourne is also an old timer, though she had a valuable cargo on board. This question of age and present values is likely to bring up the much-mooted point as to moral hazard, though it by no means settles the matter, for these old vessels are not enough to make up much of the loss aggregate by fire in the past few years. Do what we may the high percentage is left unexplained. Besides there have been plenty of periods before this when old vessels were as much off color as they are now, barring the fact that there was till now some prospect of their coming to profitable use again.

A lake authority who has been watching the fire losses says that during the past five years or so they have gone up a matter of 500 percent, as compared with other loss increases, and the class of vessels that has suffered is not by any means confined to non-money makers. What is the reason for this? The authority drops out when this question is asked. "Well, I don't know," is the best he can do. Is it electric lighting? Hardly, for at least two of those just mentioned do not appear to have them. Is it any new development of construction that is faulty? The answer is that there is no evidence of it.

Really there is some subtle influence that must have to do with such things, but it is as yet to be classed with the mysterious changes of the weather. They happen and that is all we know about them. Some day it may be found that spontaneous combustion is not as nearly impossible as it is generally supposed to be. Since the day when I found a rag with some oil and turpentine on it afire in a room where nobody had been in half an hour and no fire had been at all my former firm belief in the impossibility of spontaneous combustion has been very much shaken.

So it will have to go on as before. Fires will occur when there is carelessness accountable for it, and other fires will occur where the natural tendency to them is large, and after that there will still be fires that nobody can account for, any more than the weather experts can tell us how storms arise and how to stave them off. It has always seemed to me that it was a bad squint at human ingenuity that a vessel, so much of it immersed in water and with water the handiest thing about it, should ever need to burn up. When a building gets afire in town there is a lot of fire engines on the spot from a mile or so away, manned by crews who were asleep five minutes before, and the fire is generally out before much damage is done, but a vessel that gets afire must often burn till

the fire and water meet of their own account before the fire can be controlled.

I submit that this is a libel on our genius for invention. It ought to be an easy matter to provide water for deluging any part of a steam vessel in a moment, automatic sprinkler fashion or by turning a valve if that is too easy to go off at the wrong time. Still, fire is the most dreaded of all occurrences on shipboard, and it is just as much dreaded as it ever was.

JOHN CHAMBERLIN.

IMPROVEMENTS IN THE B. & O. SYSTEM

With the declaration of the increased dividend rate from four to five percent per annum it would appear that there is to be no cessation of the policy of reconstruction, betterment and improvement generally, that has characterized the Baltimore & Ohio since the rehabilitation of the property was decided upon. It being now made public that at a recent meeting authorization was given for further expenditures on the system approximating seven millions of dollars.

With the authorizations of like nature ordered at previous meetings, and completion pending, the total work in progress stands for combined expenditures reaching, almost, if not quite, thirty millions. Seventeen or eighteen millions have been paid out as parts were finished, and, as much of the reconstruction decided upon only a couple of weeks or thereabouts ago has already been placed under contract, it may be said that practically the whole is under way. The large order given a couple of months since for new locomotives and cars—amounting to fourteen million dollars—is not included in the foregoing figures.

The constantly augmenting volume of business is evidently a steady spur to the activity in B. & O. circles which continues to attract attention. It is officially announced that the gross earnings from traffic for the fiscal year ending with June aggregated sixty-seven and a half millions—the greatest by two and a half millions in the company's history—the net being twenty-three millions. Assuming other income from miscellaneous and investment sources to equal the previous year the general income will reach seventy millions. July of the present year showed an increase in gross earnings from operation of a half million over the same month of last year.

In large part, the expenditures authorized at the July meeting are in what might be termed the central sections of the system, augmenting the already heavy outlays upon the Pittsburg & New Castle divisions where the rapidly extending traffic has necessitated radical reconstruction of line and enlargement of facilities. The old Pittsburg & Western, and connections which bring Pittsburg and Cleveland together, and, at the same time, constitute such important links in the trunk route from the Atlantic to the great lakes, are being done over so as to be hardly recognizable. The six millions thus far expended upon cut-offs, grade lowering and doing away with curvature, is supplemented by an additional million and three-quarters, which, when applied to the purpose intended, will complete the double tracking from Pittsburg to Hamler, on the Chicago division. With the reconstruction in progress on the east end of the system, and the two remaining stretches on the Chicago division cared for, the achievement of converting the B. & O. into a double track route through without break from New York, Philadelphia, Baltimore, Washington, Pittsburg and Cleveland to Chicago will become of record.

In and about Pittsburg, on the division east, and, inclusive of the Connellsville and Cumberland divisions, a million three hundred and odd thousand of the latest authorization will be expended

LIVERPOOL SHIPPING LETTER

Liverpool, Sept. 18.—There have been persistent rumors on this side during the last few days that there was an immediate prospect of the resumption of the North Atlantic conference and that already a conciliatory between Herr Ballin and Mr. J. Bruce Ismay had been held in London to endeavor to find common ground for an agreement which would be acceptable to the Cunard company. Inquiries I have made, however, show these reports to have not the shadow of truth in them, in fact the White Star company gives them an unqualified denial. There seems to be a feeling, however, that before the next passenger season opens, the conference will be in some way rehabilitated, but no definite steps in this direction have as yet been undertaken. Since the close of the recent rate war, the conference program has been maintained in actual operation, but this has been done through the good will of all concerned, in their own interests, without the compulsion that formerly existed. Rumor has also been busy in Liverpool with regard to the present visit of Mr. Bruce Ismay to the United States. It is stated that the president of the combine has a great scheme in view with respect to the reconstruction of his undertaking, involving considerable changes. The White Star company has been questioned with regard to the rumors referred to, but the only answer given was that Mr. Ismay is proceeding to the United States on one of his periodical business tours.

A decided increase in emigration during the eight months of the current year is shown by the British Board of Trade returns just issued. The total figures are 314,000, compared with 279,635 during the corresponding period last year. The largest number, 187,314, went to the United States, while 118,431 went to the British colonies. Canada received the largest number—85,755—of those going to the colonies, while 8,083 went to Australia and New Zealand, 18,156 to British South Africa, 2,592 to India and Ceylon, and 3,845 to other British colonies.

It is anticipated here that the coming season in the North American trade will be a good one. The position in the United States is regarded as having brightened very materially, and grain freights are going up satisfactorily—always a good sign. The Dominion line has already put into commission two steamers that have been lying up since the close of last season, and announce the increase to weekly sailings of the Portland steamers. The International Mercantile Marine Co. has also taken over the three Atlantic transport liners Manitou, Menominee and Marquette, and placed them on the regular cargo and passenger service between Antwerp and Philadelphia.

It is also reported here that the Canadian Pacific Railway Co. intend to make Liverpool the head office in Europe for their steamship business which is now centered in London. Their two new fast steamers now building are expected to be ready for the opening of the next season's St. Lawrence business, and will be put in the Liverpool trade. One of these is almost ready for launching, and might have been in the water before now, but no advantage would have been obtained by pushing matters. It is therefore on the internal positions of the ships that attention is directed, and great progress is being made with the passenger accommodation, which, when completed, will be superb. The engines are also so far advanced that they are being erected, and everything promises well for the new palatial Canadian Pacific railway steamers being ready as soon as they are needed next year.

The Cunard company has decided to try the new American coaling elevator in connection with the bunker-

ing of their ships. The experiment is shortly to be made, and, if successful, is bound to bring about a great change as regards the coaling of ships at this port, the method at present being a very antiquated one, and altogether out of harmony with the advancement in other directions. Clark's automatic bunkering system has certainly made a great impression over here.

During the present year British ship owners have suffered heavily owing to casualties to vessels, and the losses exceed those for the corresponding period of last year. During the whole of last year the number of vessels totally lost was 225. Already this year the total losses amount to 171, so that unless there is an improvement this year's record of losses will prove more serious than the previous twelve months. The total tonnage lost works out at 302,202 tons, compared with 379,300 tons for the whole of 1904. Of the vessels totally lost, 33 were British steamers with a total tonnage of 85,135 tons; 18 were British sailing vessels, the total being 29,366 tons; 72 were foreign steamers with an aggregate tonnage of 135,172; and 48 were foreign sailing vessels totaling 52,532 tons. Of these casualties 79 were due to strandings, 19 to collisions, 11 to fires and explosions, 44 either foundered or were abandoned at sea, while 17 are missing and given up as lost. The partial losses have also been very heavy, numbering 4,018, compared with a total of 5,273 for the whole of 1904. They were chiefly due to strandings and collisions.

On Sept. 13 Messrs. R. Craggs & Sons, Ltd., launched from their Tees dockyard, Middlesbrough, a fine steel cargo steamer, 358 ft. 6 in. long, by 50 ft. 8 in. beam, by 25 ft. 6 in. depth molded, which has been built to the order of the English & American Shipping Co., Ltd., of which Messrs. C. T. Bowring & Co., Liverpool and London, are managers. This vessel is being built under special survey in excess of the highest class under Lloyds three-deck rule. Cellular double bottom is fitted throughout for water ballast, also fore-and-aft peaks, the total amount provided being about 1,270 tons. Six powerful steam winches are provided of the most approved type, and the arrangements for handling ship and cargo are most complete in every respect, including special equipment for the trades in which the ship will be engaged. The vessel has been named *Zafra*.

Anent the increasing number of ship fires at sea Consul General Neville-Rolfe reporting on the trade of south Italy for 1904 offers some interesting remarks for reducing or at least extinguishing shipboard fires as they arise. He says: "To diminish the risks incurred by the ignition of cargo in the holds of ships a proposal has been made to stow carbonic acid among the contents of the hold. This substance can be had in solid form, or perhaps might be stored in steel cylinders in the liquid condition. In either form it would be absolutely innocuous to cargo even if of the most delicate description, and as its density is very high, it would permeate all the interstices between bales and cases, and sink to the bottom of the hold. Wherever it reaches nothing can burn, so that perfect immunity from fire would be obtained up to the level of the gas. How much gas would be required must not be calculated by the cubic measurement of the hold when empty, as the gas would not be applied till the hold was stowed, nor would it be necessary that the level of the gas should be higher than the hatches of the lower hold, because if a fire broke out above them it would in all probability be extinguished with the ordinary appliances. The gas itself is a waste product of breweries, and the only cost is the expense of the condensing plant, so that enough gas to secure immunity from fire in the lower

hold of a large ship when stowed with a closely packed cargo of a combustible nature, would not be a very serious expense when the practicable utility of its presence is considered. A further and not inconsiderable advantage would be that the presence of the gas would entirely free the lower hold from the presence of rats and other vermin. As to the hygienic effect of introducing carbonic acid gas into the hold of a ship, it must be remembered that the holds of passenger ships are not mere caverns, extending perpendicularly from the keel to the upper deck, but are constructed in as many stories as there are decks to the ship, the lower hold being covered with battens when filled, and the successive holds being treated in the same way. Hence as the gas can in no circumstances rise, the lower hold alone would be dangerous, and as matters now stand, no competent stevedore would enter the lower hold unless he had first tested the atmosphere with a lighted candle.

The London *Engineering*, discussing the speed in the starting of steam turbines asks: "If a large steam turbine is cold and at rest, how quickly can it be started? Can it be brought up to speed as readily as can a good cross-compound engine that is cold all over? We have taken the time," proceeds the article, "in a number of instances when all the auxiliaries have been in motion, and it only remained to start the turbine and phase it in on the line; the only valves to open in such cases are the throttle and one small oil valve. The two quickest starts have been made in 45 seconds and 70 seconds respectively, including phasing-in. Others range between one minute and ten seconds and one and a half minutes. These two quickest starts were made on a turbine which had stood for twenty-four hours with the throttle-valve shut tight, though there was a slight leakage past the seat. After the throttle-valve is off its seat, it is not more than thirty seconds before the turbine is up to speed. A cross-compound reciprocating engine of the four-valve type, 2,250 H. P. capacity, can be brought up to speed from a standstill in five minutes if it is hot all over. This five minutes is to be compared with the seventy seconds required for the similar turbine operation. A reciprocating engine which is turning over slowly, with the throttle-valve just off its seat, or with by-pass open and having all its oil cups open and regulated, can be brought up to speed, say seventy-five revolutions in two and a half minutes. This can be compared with the thirty seconds necessary for bringing the turbine up under the same conditions—that is, about one-fifth the time necessary for bringing up the engine. If the engine is cold all over, and has all its oil cups shut tight, all its auxiliaries quiet, fifteen minutes is called a rapid start. Starts have been made under such conditions in twelve minutes. When we start a cold turbine, we open up the valve and let her turn, and in two minutes we are ready to bring her up to speed, and she will be at speed in two and a half minutes—one-fourth the engine's time."

I have just received the Manchester ship canal traffic returns for August. They show that the revenue received was \$192,870, against \$172,620 in August, 1904. The total increase for the eight months of the current year is now \$86,205.

The North German Lloyd steamer Bremen, bound from New York to Bremen, was towed into Halifax last week with a broken propeller shaft by the British tank steamer Lucigen. When the Bremen was two days out from New York her shaft broke suddenly and she drifted for one day until picked up by the Lucigen. Repairs on the Bremen will probably be made at Halifax.

SCHERZER ROLLING LIFT BRIDGES

The principal tendency in railroad construction in the United States for the future will be to increase the number of parallel tracks instead of the construction of pioneer or competing single-track lines, which was the principal tendency in construction during the first fifty years. At the present time more than 200,000 miles of single-track railroad have been constructed, but the second, third, fourth and sixth tracks constructed amount to less than 20,000 miles. During the past ten years traffic increased on some railroads so rapidly as to require first double tracks, then four tracks, and now in some cases six tracks. These railroads are now very prominent, but their experience in developing increased traffic will be common in a large degree to all of the single-track railway lines of the United States. All of them will have to increase the number of their parallel tracks to accommodate their increasing traffic. It is safe to predict that the existing railroad traffic will be doubled in the next twelve years and that this ratio of increase will continue for decades to come.

A prominent feature connected with the handling of increasing traffic and the construction of the additional parallel tracks required is the extensive removal of single and double track center-pier swing bridges and their replacement with modern Scherzer rolling lift bridges. One of the inherent limitations of the center-pier swing bridge is the fact that it cannot be enlarged or widened to accommodate additional tracks. It must always be discarded and removed at a great loss, also disarranging traffic, for if a new swing bridge were constructed alongside of an existing swing bridge, it would be impossible to operate either of them because they interfere with each other. This difficulty is overcome by the modern Scherzer rolling lift bridge, which can be constructed as a single-track structure and be enlarged to a double or multiple track structure at any time without interfering with the existing bridge or disturbing the existing traffic by simply adding the new bridges alongside of the existing structure.

Some of the notable Scherzer rolling lift bridges constructed and under construction to replace center-pier swing bridges in this movement to accommodate increased traffic and additional parallel tracks are:

The four-track bridge for the Metropolitan Elevated Railway Co., Chicago; the double-track bridge for the Chicago Terminal Transfer Railroad Co. at the entrance to the Grand Central station, Chicago; the eight-track bridge, Chicago, used by the Pennsylvania lines west of Pittsburgh; the Chicago Terminal Transfer railroad; the Chicago Junction railroad and the Baltimore & Ohio railroad; the single track bridge used by the Big Four railroad at Cleveland; the double-track bridge used by the Big Four railroad, the Lake Shore & Michigan Southern railway and the Erie railroad at Cleveland; the double-track bridge used by the Newburgh & South Shore railroad, Cleveland; the double-track bridge used by the Baltimore & Ohio railroad at Cleveland, replacing a single-track swing bridge; the two Scherzer bridges used by the Central Railroad Co. of New Jersey, the Reading railroad and the Baltimore & Ohio railroad across Newark Bay, New Jersey; the double-track Scherzer bridge used by the Boston, Revere Beach & Lynn railroad; the six-track Scherzer bridge at the entrance to the South Terminal Station, Boston; the four-track Scherzer bridge used by the New York, New Haven & Hartford Railroad Co. at Bridgeport, Conn., replacing a double-track swing bridge. There are now also under construction for this company four-track Scherzer bridges at Cos Cob, Conn.; Westport, Conn., and over the Housatonic river, Connecticut; also

over the Neponset river, Massachusetts. A double-track Scherzer bridge is under construction across the Connecticut river to be enlarged subsequently to a four-track structure. Six-track Scherzer bridges are also to be constructed across the Bronx river and across the Hutchinson river, New York, replacing four-track swing bridges. A double-track Scherzer bridge has been placed into service recently for the Southeastern & Chatham Railway Co., England, across the Swale river, England, and another is nearing completion across the Suir river, Ireland, for the Fishguard & Rosslare railways. A three-track Scherzer bridge is under construction for the Dutch State Railways, Holland, and a double-track Scherzer bridge is under construction for the Buenos Aires Great Southern railway across Riachuelo river, Buenos Aires, replacing a center-pier swing bridge.

The more than forty Scherzer bridges already constructed for the use of electric railway companies have nearly all been constructed as double-track and multiple track structures. They can readily be enlarged at any future time to accommodate increasing traffic and additional tracks without disturbing the existing bridges or traffic.

SHIPPING OF THE PHILIPPINE ISLANDS

By H. B. M'Coy, Deputy Collector of Customs for the Philippine Islands.

The title of this article is probably a misnomer, for practically the Philippine Islands have no shipping. The coastwise fleet consists of comparatively few vessels, inadequate in number to handle the business of the islands at reasonable rates, expensive in operation and lacking to some extent at least a manning personnel of experience and training. There are no vessels of Philippine registry in the carrying trade between the islands and foreign ports; all the commerce, import and export, coming and going in foreign bottoms.

At this point a few statistics may illuminate the statement made above and establish a point from which to view the shipping conditions and possibilities. During the year 1904, 550 vessels, having a net registered tonnage of 1,005,488 tons, entered the port of Manila, bringing freight aggregating 624,092 tons, valued at \$25,849,208 gold. Of this import tonnage 75,062 tons, valued at \$4,916,543, was from the United States and 2,525 tons, valued at \$554,067 was from Hongkong. This Hongkong tonnage does not represent the quantity actually carried by the Hongkong-Manila steamers, as it does not include foreign transit cargo transhipped at that port for Manila and other Philippine ports. Of these vessels 82 with a registered tonnage of 254,407 tons were of American registry, arriving from the United States, and 194 with a registered tonnage of 266,527 tons were of foreign registry arriving from Hongkong. Of the import tonnage brought to Manila, merchandise to the value of \$2,326,420, or less than fifty percent of the importations from the United States, arrived in American vessels; and merchandise to the value of \$301,420 (a trifle over one percent of the total) was carried in vessels of the Philippine Islands and consisted mainly of rice cargoes imported from Saigon.

The export trade of the islands shows practically the same conditions and proportions. During the year there was exported from the port of Manila 162,404 tons of merchandise valued at \$22,562,402 gold. Of this 49,554 tons valued at \$8,813,742 went to the United States, and 9,076 tons valued at \$1,192,292 went to Hongkong. Again the Hongkong tonnage does not correctly represent the shipments to or through that port, as transit cargoes are not included therein. Of the total exports only \$2,011,002 was carried in American bottoms, and none in vessels of the Philippine Islands.

From the above exhibit the conclusion is easily and readily

drawn that we in the islands are at the mercy of foreign ship owners, both as to our import and export carrying trade, that we can have no effect upon its conditions nor voice in its operation or control, and the payment of freight charges, both incoming and outgoing, is a continual charge against our production.

The causes of the present shipping conditions are easy of determination. Up to and including the present moment no facilities for the building of modern ships exist in the Philippine Islands, and none can exist till a long step in advancement has been taken as to material conditions. Commercially speaking, no coal is mined or produced in the Philippine Islands, and coal necessary for the operation of steam vessels—as well as all kinds of machinery and manufacturing plants—is brought from foreign countries. Under the Spanish government a majority of the officers of coastwise vessels were Spanish subjects rather than Philippine citizens. No effort had apparently ever been made to educate and develop competent ships' officers and engineers, and many of the officers of coastwise vessels are still Spanish subjects who were residing in the Philippine Islands on April 11, 1899, and who were then serving as ships' officers in the coastwise trade.

By an act of Congress approved April 15, 1904, it is provided that "On and after July 1, 1906, no merchandise except supplies for the army or navy shall be transported by sea, under penalty of forfeiture thereof, between ports of the United States and ports or places in the Philippine archipelago, directly, or via a foreign port, or for any part of the voyage, in any other vessels than a vessel of the United States; but this section shall not be construed to prohibit the sailing of any foreign vessel between any port of the United States and any port or place in the Philippine archipelago, provided that no merchandise other than that imported in such vessels from some foreign port, which has been specified on the manifest as for another port and which shall not have been unloaded, shall be carried between a port of the United States and a port or place in the Philippine archipelago." Under the terms of this law, on and after July 1, 1906, the Philippine Islands, for the purpose of trade between the United States and the islands, practically become a part of the coastwise trade of the United States, and all commerce between the United States and the islands must be carried on in American vessels; it being presumed that vessels of the Philippine Islands registered therein and flying the American flag will be construed to be vessels of the United States. The effect of this law upon the trade between the islands and the home country is problematical.

We exported to the United States in the year 1904, \$8,813,742 worth of Philippine products, of which \$1,806,557 worth, or about 20 percent, was carried in American vessels. These exports consisted mainly of hemp, the value of that article shipped to the United States being \$8,717,095 United States currency, leaving but \$96,000 to be accounted for by other articles of Philippine production. Apparently the act of Congress above quoted will not have an injurious effect as far as the exports of the islands to the United States are concerned, unless it should so increase freight rates on Manila hemp as to compel users of hemp in the United States to find a substitute therefor. Neither can it seriously or injuriously affect the Philippines in the matter of imports from the United States, for reason that if freight rates are advanced on articles imported from the United States the merchants doing business here will cease to buy in the United States and will transfer their trade elsewhere, so that it is fair to presume that the effects of this law, if felt by any one, will be felt by the people of the United States and not by the Philippine Islands. The wisdom of this act of Congress is justified by the desire to retain in the hands

of our own people, be they residing in the United States or in the Philippine Islands, the carrying of our own products and manufactures between our own ports, and it is undoubtedly true that as the carrying trade demands it a sufficient number of vessels will be engaged in the traffic between the United States and the Philippine Islands to transport cheaply and economically the cargoes offered and that this fleet of vessels will be augmented as the increase in the business demands.

The coastwise fleet of the Philippine Islands consists of 510 vessels ranging from 20 to 600 tons, the greater part of these being steamers and sailing vessels of comparatively small tonnage. In addition to these vessels there are several hundred small vessels under fifteen tons gross which operate under what is known as special coastwise license, and which are at the present time limited in their operations to certain parts of the coast line of the islands.

The Philippine Islands have a coast line of over 11,000 miles, more than double that of United States. We are without railroads, except the line between Manila and Dagupan, and no wagon roads exist over which our trade can be transported. For these reasons among others the flow of inter-island trade and travel is controlled by, and dependent upon, such coastwise vessels as are available for service. If these vessels are adequate, and transport freight and passengers at reasonable rates, and if they furnish service to all parts of the islands, production will increase, business revive and conditions become better. If, however, the service is not equal to the demands, or if the rates charged are exorbitant, production will decline or remain stationary and business languish. The lack of transportation facilities and the lack of means whereby products may be readily forwarded to market has unquestionably retarded development and production, and no great progress, commercially or otherwise, can be hoped for or expected till more rapid and less expensive transportation facilities are provided.

The government is apparently willing and anxious to advance material conditions in every possible way, and is also ready to foster and protect the interests of the people to every possible extent. The shipping interest is, primarily, the interest of the inhabitants of the island and they are the ones who are charged with the responsibility of its development and betterment. The government may establish nautical schools for the training of young men as navigators and engineers; it may build wharves and piers; improve harbors and build lighthouses; but it probably will not build, own and operate vessels. This must be done by the people.

The present laws provide that vessels may operate in the coastwise trade, provided they are owned, "1. By a citizen of the United States residing in the Philippine Islands, or a corporation or company created under the laws of the United States, or any state thereof, or of the Philippine Islands, provided that any duly authorized officer of such corporation or company, or the managing agent or master of the vessel for which the license is sought, resides in the Philippine Islands; 2. A native inhabitant of the Philippine Islands, upon taking the oath of allegiance to the United States; 3. A resident of the Philippine Islands before April 11, 1899, hitherto a subject of Spain, upon abjuring his allegiance to the crown of Spain and taking the oath of allegiance to the United States;" provided such vessels are registered and take out the necessary license to engage in the coastwise trade. Practically, this reserves to the inhabitants of the Philippine Islands all rights to engage in the inter-island carrying trade, and puts upon them the burden and responsibility of providing a coastwise fleet adequate to handle the business of the islands as it at present exists, and to provide a sufficient and adequate increase to the fleet as business conditions demand; bearing in mind always the

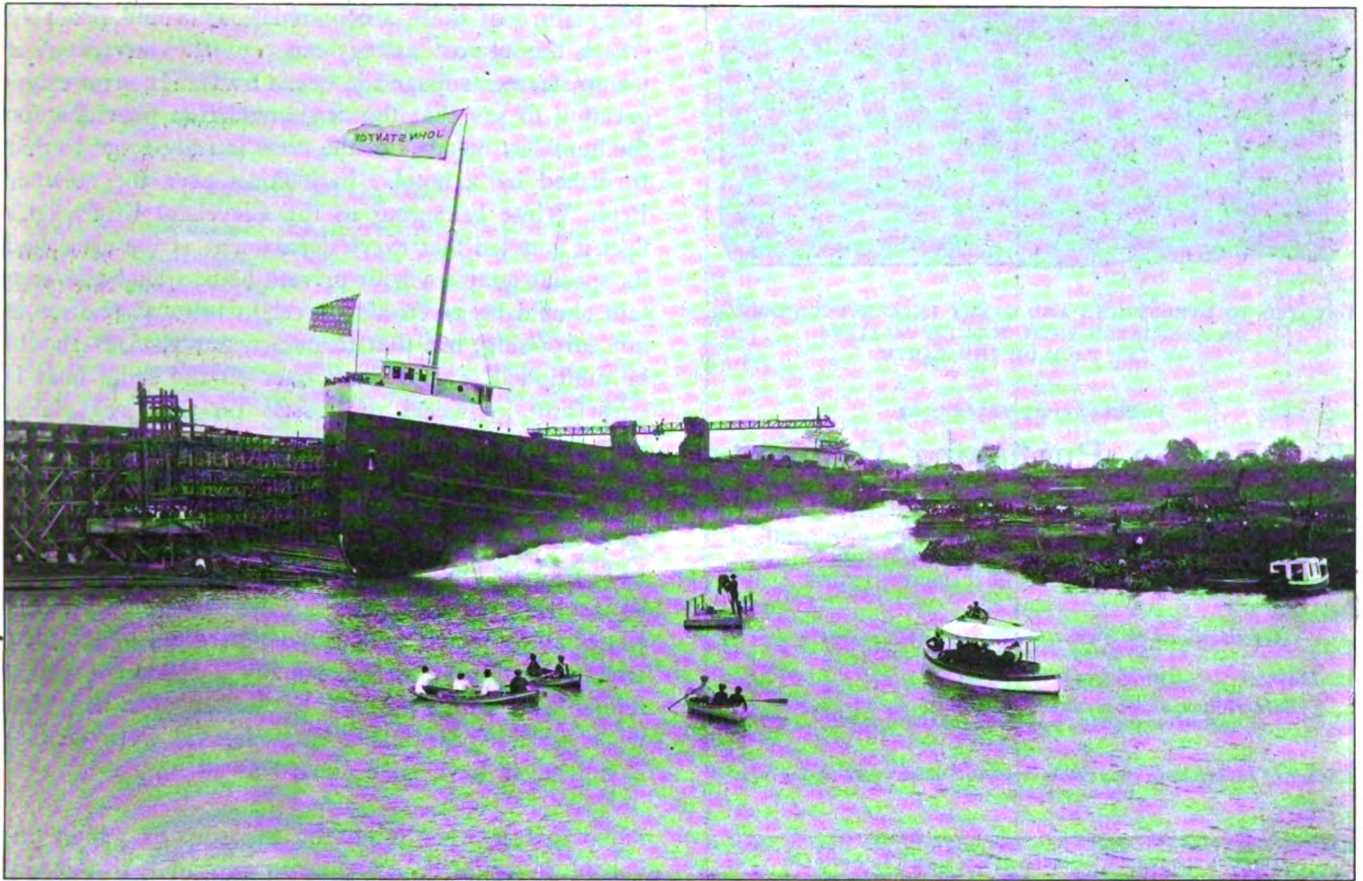
fact that increased production and development must be encouraged and stimulated by transportation and communication facilities. Up to the present time the provisions of the law have not, apparently, had the desired effect, and no radical change in the commercial or material development of the islands will occur till it is encouraged and fostered by improved facilities.

If we cannot build vessels in the Philippine Islands we can at least own them, and no reason exists at the present time why vessels for the coastwise trade and, for that matter, for the foreign trade, cannot be purchased abroad by one of the classes of citizens authorized to own and operate vessels, brought to the Philippine Islands, and registered therein. This, to my mind, would be infinitely better than to allow the present conditions to exist without an effort being made to improve them. As long as it is necessary to import the immense quantities of food products, especially rice, which are annually brought into the Philippine Islands, there is apparently no reason why such food products should not at least be carried in vessels of the Philippine Islands. This would save to us the immense sum of money which is now paid out for carrying charges, and would furnish employment to a large number of seamen.

Neither is any reason seen why vessels of the Philippine Islands should not control the immense carrying trade between our ports and the port of Hongkong, and again save to the people of the islands the freight charges now being paid to these vessels. European cargo at the present time is being transshipped in foreign vessels from the port of Singapore to the ports of Iloilo and Cebu, instead of being brought to Manila and shipped to Iloilo and Cebu by coastwise vessels, for the reason that a cheaper rate of freight can be obtained out of Singapore than can be obtained out of Manila, and this is one of the best illustrations of the expensive operations of the coastwise trade. It is a condition that badly needs a remedy, and that remedy is, primarily, increase in the number of ships, increased efficiency in both officers and crews, and a material and decided decrease in the cost of operation.

The government is spending immense sums of money in the improvement of the ports at Manila, Iloilo and Cebu, and at all three of these ports it is building docks and piers and providing facilities for the landing and discharge of both foreign and coastwise ships. Unless the people take advantage of these improvements the material benefit will go to the owners of the foreign ships which enter these ports.

No nation or people have become great, prosperous or influential among the nations of the world without first becoming powerful on the seas and without a merchant marine capable of carrying its products and manufactures to other countries and returning with the merchandise received in exchange. The Dutch Republic was a power in the world because her merchant fleet covered the seas and she carried the products of other countries to the world's markets. She sank almost to insignificance after her fleets were destroyed by the growing power of England. Spain and France were shorn of their influence by the same great sea power, and all three nations were deprived of their colonies and almost all their commerce by the English people. Japan within the last fifty years has risen to prominence in the world's affairs primarily on account of her development on the sea, and her recent wonderful success is due to her ability to control the seas as against her enemy, and to transport in her own vessels soldiers and supplies. The protection which our commerce needs is at hand in the navy of the United States. The only thing which remains to be done is the development of the carrying trade, and this rests solely and entirely with the people. Will they take advantage of it, or not?



LAUNCH OF THE STEAMER JOHN STANTON AT THE LORAIN YARD OF THE AMERICAN SHIP BUILDING CO.

For description see *Marine Review* Sept. 21.

PROPOSAL TO DIG PANAMA CANAL BY CONTRACT

Mr. Lindon W. Bates, hydraulic engineer, of New York, formerly of Chicago, has signified to the Panama canal board his willingness to build the Panama canal by contract. It is understood that Mr. Bates, backed by a highly capitalized engineering firm, is ready to invest \$15,000,000 or \$20,000,000 worth of plant and cash at the outset, and give bond to the government, as is done in all other contracts. Some weeks ago Mr. Bates submitted in printed form a project for excavating the canal. At a meeting with the board this week he is reported to have said: "It is held as incontrovertible that by the system here proposed an adequate canal can be constructed far more cheaply than under any other plan that has been suggested, both as to absolute and unit cost. The summary gives general estimates in regard to comparative cost. I am of the opinion that detailed estimates have little value unless based upon the contract system, upon definitely selected plant and methods and upon a precise program of execution and payment. It cannot be too clearly realized that the unit cost of buildings and structures, of making the excavations and of distributing the spoil must and will vary greatly in the various projects, and according to the means and methods employed and whether the contract or government eight-hour day's work system be pursued." It is under the assumption of a contract system with the greater economies and efficiency which it insures, and embodying his own experience in encountering hydraulic problems at home and abroad into his purposed means and methods that the writer makes for himself his schedule of unit prices and arrives at the table of costs. In his deductions, conclusions and figures he has at stake not simply the deliverance of an engineering opinion, but the pronouncement

of an exact and final price behind which must be entrenched the capital guaranteeing a contract for the canal construction, which his project purposes. He submits that his plans can be best executed by an organization having an adequate capital which will enable the whole work, engineering and executive, to be responsibly undertaken under proper safeguards, for the following definite sums per statute mile as and when completed, the canal reckoned as 40 miles from sea to sea, government administration, sanitation and policing cost not included: Project A, \$3,375,000 per mile; Project B, \$3,125,000 per mile; Project B*, \$2,787,500 per mile. Project "A" refers to a 26½-ft. level, Project "B" to a 62½-ft. level and Project "B*" to a 96½-ft. level. He will undertake to complete Project "A" in nine years, Project "B" in eight years or Project "B*" in seven years.

The new ferry steamer for the Washington-Alexandria line was launched this week at the yard of the Harlan & Hollingsworth Co., Wilmington, Del., in the presence of a number of officers of the Norfolk & Washington Steamboat Co., who are the owners of the ferry line. The new ferryboat is a double screw steel vessel 190 ft. over all, 175 ft. 10 in. between rudder posts, 57 ft. beam and 39 ft. molded depth. The hull is divided by four transverse watertight bulkheads and two longitudinal watertight wing bulkheads. The ferry has been named the Woodbury.

The Merrill-Stevens Engineering Co., Jacksonville, Fla., has been awarded contract to build eleven steel harbor barges for government use in the harbor of Panama. Five of them will be flush deck barges, 75 by 25, and six open hold barges, 40 by 15.



DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED
OR ASSOCIATED WITH MARINE MATTERS
ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company
CLEVELAND.

CHICAGO:	MONADNOCK BUILDING.
PITTSBURG:	PARK BUILDING.
NEW YORK:	150 NASSAU STREET.

*Correspondence on Marine Engineering, Shipbuilding and
Shipping Subjects Solicited.*

Subscription, \$3.00 per annum. To Foreign Countries, \$4.50.
Subscribers can have addresses changed at will.

Change of advertising copy must reach this office on Thursday preced-
ing date of publication.

The Cleveland News Co. will supply the trade with the MARINE REVIEW
through the regular channels of the American News Co.

European Agents, The International News Company, Brems Building,
Chancery Lane, London, E. C. England.

Entered at the Post Office at Cleveland, Ohio, as
Second Class Matter.

SEPTEMBER 28, 1905.

Secretary Metcalf of the Department of Commerce and Labor has ordered George Uhler, supervising inspector general of the steamboat inspection service, to reinspect all steamers in the United States in order to see that their equipment harmonizes with the new rules passed by the last congress. This order has been transmitted to all the supervising inspectors, including those on the great lakes. Naturally there is nothing left for the supervising inspectors to do except to order the local inspectors to make the examination, regardless of the fact that such an examination is obviously impossible before navigation closes on the lakes. Some of the passenger boats have already ceased running and are now safely in winter quarters, but they will be inspected nevertheless. This order is in many respects absurd and would not have been issued had Secretary Metcalf been acquainted with actual conditions of the service.

There are a great many steamers plying the various waters of the world, but it is probably beyond dispute that nowhere aboard ship is labor treated as well as it is on the great lakes. Not only are the wages the highest for like service, but the accommodations provided for every member of the crew are of the best.

The nature of these accommodations would probably create the utmost astonishment to the master of a tramp steamer engaged in ocean trade. It is no exaggeration to say that the accommodation provided for the humblest member of the crew is fully equal to that furnished by a hotel. In looking over the steamer Peter White belonging to the Cleveland Cliffs Co.'s fleet it is noted that every department of the crew had its special quarters with private bath. That the captain should be given his porcelain tub and shower is not surprising, but that these accommodations should be multiplied several times over on the same boat is surprising. Owners of vessels on the great lakes have been actuated by the theory that if superior accommodations were furnished the members of the crew a superior grade of men could be secured for service. This theory is being borne out in practice. In years past the general run of lake sailors may have been a hard lot but such is not the case today. Better wages and better treatment have attracted better men, and the rank and file have many a clean cut young fellow who will some day be master of a ship, but who, if these selfsame accommodations were lacking would never have gone aboard at all.

No matter what might be the sum of money involved, it would be economy to expend it in improving the great river system of the United States. A waterway is the ideal system for the transportation of articles in the raw state, that is, articles that may be bulky or low in price and which cannot afford to pay a high rate for transportation. The railway is the ideal system for the distribution of light-weight, high-class articles. Freight charges upon a high-class article are a very small part of its total expense, but freight charges on a bulky low-class article may reach a considerable percentage of the value of the actual article itself. For that reason cheap transportation is absolutely essential if any business is to be done at all. Light draught boats on the Ohio and Mississippi rivers are now carrying an enormous quantity of freight by taking advantage of the annual rises when nature provides a navigable depth of water. This enormous tonnage could not be moved at all were it not for this provision of nature.

What is required, however, is a channel navigable all the year round and when it is obtained it will be seen that the Ohio and Mississippi valleys will grow amazingly. What is wanted is a channel whereby the bulk freight of the north can continually reach southern points by water. At present the lack of this channel imposes a serious handicap upon manufacture and agriculture. In this respect the southern farmer is better off than his northern brother. A bale of cotton at 10 cents a pound brings \$50. At 80 cents a bushel it takes sixty-two bushels of wheat to bring the same sum, while at 40 cents a bushel 125 bushels of corn must be sold to bring \$50. The bale of cotton will weigh 500 lbs., the wheat 3,700 lbs. and the corn 7,000

lbs. This enormous disproportion in weight and bulk explains quite clearly why cheap transportation is absolutely necessary if the products of the west are to reach the east at reasonable cost.

FREIGHT SITUATION

There has not been at any time during the year a firmer feeling in the freight market than there is at present. Grain is beginning to move in quantity and is taking care of the surplus tonnage at a material advance over the former rates. There is no prospect, however, of any advance in the coal and ore rate. Contract vessels are taking care of the ore movement and the coal movement has fallen off considerably, owing to the fact that upper lake ports are well filled up with it. Ore shipments for the month will probably show a marked falling off from the shipments of the preceding three months. The Duluth, Missabe & Northern road which has been the heaviest shipper, will be about 500,000 tons behind for the month, and the Duluth & Iron Range railway will not exceed 1,000,000 tons. The Great Northern is also behind, while the roads running from the old ranges seem to be maintaining their business very well. The excessive rains on the Mesabi range have been the cause of this lessened movement. It is expected, however, that the total movement up to Oct. 1 will be 25,000,000 tons.

STEAMER PETER WHITE

The guests who attended the launching of the Wm. G. Mather at the Ecorse yard of the Great Lakes Engineering Works on Saturday last had the pleasure of inspecting the new steamer Peter White which, with steam up, was lying at the yard about to enter upon her maiden trip. The White is 524 ft. over all, 504 ft. keel, 54 ft. beam and 30 ft. deep, and is equipped with triple expansion engines 23, 38 and 63 in. cylinder diameters by 42 in. stroke, supplied with steam from two Scotch boilers 14 ft. 9 in. diameter and 12 ft. long, fitted with induced draft and allowed a pressure of 175 lbs. per square inch. The new steamer hoarsely saluted the Mather as she took the water. An examination of the White shows to what pains the large operating companies go to entertain their occasional passengers on these freight steamers. The passenger accommodations on the White are elegant, though by no means the most complete among the vessels of the fleet. It is doubtful, however, if any vessel on the lakes has her passenger accommodation furnished in such exquisite woodwork. The woodwork is of dark oak and of beautiful design. Capt. S. N. Murphy will command the White and Fred D. Philip will be her first engineer.

CHICAGO GRAIN REPORT

Chicago, Sept. 26.—Grain freights opened the week under strong tendency at $1\frac{1}{4}$ cent to $1\frac{3}{8}$ cent Buffalo corn, according to loading locality, all water routing to Montreal basis ruling firmly at about $4\frac{1}{4}$ cents corn. Prompt loading carriers are in especially good request, the favorable features being in that wheat and corn prices are at a steady shipping basis for eastern and export account, while with the improved Lake Superior call, the package freight movement promises to engage the local line steamers well into the closing of season. The advance of $\frac{1}{2}$ cent per bushel in rail rates at and east of Buffalo effective Oct. 1 is likely to develop some chartering at $1\frac{1}{2}$ cents corn ere the close of present week.

Shipments of the past week were distributed about as

follows: Via all rail lines of flour, 67,367 bbls.; wheat, 154,807 bu.; corn, 239,523 bu., and oats, 1,170,478 bu. Via lake to Buffalo and other American points of flour, 101,885 bbls.; wheat, 74,368 bu.; corn, 1,954,100 bu., and oats, 312,025 bu.; and via lake to Canada points of corn, 120,600 bu.

Lake and Rail Shipments:

	This week.	Last week.	Same week last year.
Wheat	229,175	193,883	440,929
Corn	2,941,929	1,622,360	3,313,734
Oats	1,602,603	1,245,606	776,266
Rye	9,505	14,964	18,060
Barley	89,822	100,108	72,207
	4,873,034	3,176,921	4,621,196
Flour	196,564 (bbls.)	212,421	99,174
		Since Jan. 1, 1905.	Same time last year.
Wheat		9,890,034	10,930,808
Corn		72,077,830	55,435,179
Oats		40,260,744	33,779,892
Rye		761,074	906,280
Barley		2,916,576	3,038,498
		125,906,258	104,090,657
Flour		4,579,855 (bbls.)	5,420,006

Stocks of Grain in Private and Public Elevators:

	This week.	Last week.	Same week last year.
Wheat	5,577,000	5,426,000	4,739,000
Corn	4,536,000	4,175,000	5,553,000
Oats	9,721,000	9,263,000	10,177,000
Rye	182,000	163,000	546,000
Barley	120,714	89,714	138,000
	20,136,714	19,116,714	21,153,000

AROUND THE GREAT LAKES

The Murray Co., of Saginaw, Mich., has received a contract to construct the second section of the Harbor Beach breakwater to cost about \$200,000.

Work on the first of the two Gilchrist freighters ordered for 1906 delivery has been begun at the Bay City yard of the American Ship Building Co.

Capt. Whitney Carr has been appointed assistant to Capt. Samuel Leonard, who is manager of the Great Lakes Towing Co. at Ashtabula and Conneaut.

The steamer Maritana, which was on the rocks at Detour, has been put in drydock at Cleveland. Her injuries are not as serious as was expected.

The barge M. S. Bacon sprang a leak while lying at the Wisconsin Central dock at Ashland. It was necessary to beach her to prevent her from sinking in deep water.

The steamer Henry C. Frick, the last of the quartet ordered by the Pittsburg Steamship Co., cleared for her maiden trip from Bay City on Saturday last under command of Capt. Neil Campbell.

In the account of the launch of the steamer John Stanton, Mr. Stanton was made to say "The copper production of the United States during 1904 had a value largely in excess of the value of coal and silver mined in the country last year." This should have read "gold and silver."

The Cleveland & Buffalo Transit Co. will continue its daily service until Dec. 1. The fall trips to Buffalo are among the most delightful. The company will honor all tickets reading via the Lake Shore & Michigan railway without extra charge. Both the City of Erie and City of Buffalo are flyers and afford the most pleasurable means of getting to Niagara Falls.

SHIPBUILDING IN GERMANY

The considerable amount of activity which prevails in the German ship building industry at the present time tends to indicate that this branch has embarked upon a fresh era of prosperity, as the tonnage under construction or on order for the leading shipping companies constitutes a record for that country, to say nothing of the contracts in course of execution for the navy. In round figures the tonnage of steam and sailing vessels built in 1904 by the members of the Association of German Ship Building Yards amounted to 262,000 gross register tons, but this total does not agree with that contained in the recently issued annual report of the Association of East German Manufacturers. This association states that the aggregate output of both classes throughout the country was 260,000 tons, or 44,000 tons less than in 1903. If the latter figures are accepted as correct, and it is desired to ascertain the tonnage added to the merchant marine in 1904, it will be necessary to deduct from the aggregate the tonnage of warships completed, as well as that of tugs, lighters, dredgers, etc., which scarcely come within the scope of the merchant navy. Having taken these particular vessels into consideration, the report shows the addition of steamers, totaling 170,000 tons, as compared with 217,000 tons in 1903, and sailing vessels of 2,100 tons, as contrasted with 8,800 tons in the previous year. The large number of small sailing vessels built is obviously not included in the latter total, on account of their slight individual tonnage. If, then, the reduction in the new construction during 1904 is unsatisfactory from the German point of view, the opening of the present year has entirely altered the situation of affairs. We thus find at the beginning of 1905 the tonnage of steamers in course of building was no less than 203,000 tons as compared with 102,000 tons at the commencement of 1903, while the figures for sailing ships were 8,700 tons and 1,500 tons respectively.

If the volume of new construction was less satisfactory from the German standpoint in 1904 than in the preceding year, the builders themselves have no occasion, taken altogether, to complain of the financial results which attended their activity, although a portion of the latter extends to branches other than shipbuilding in certain cases. For instance, the Stettin Vulcan Co., which was able to distribute a dividend at the rate of 14 percent in 1903, has succeeded in maintaining the same rate for 1904. The Rickmers company also adheres for the past year to the rate of 7 percent paid in 1903, while the 3 percent distributed by the Stettin-Oder company a year ago is being repeated for 1904. Two firms, which owing to exceptional circumstances, were unable to pay any dividend in 1903, have again returned to the prosperous stage. The first is the Bremen Vulcan—which, having extinguished its 'disastrous investment in a Belgian ship building yard, pays 6 percent; and the second is the Howaldt Works company, which distributes 4 percent, having apparently wiped out the losses incurred on a warship contract. Coming next to the undertakings which experienced a slight set-back in the financial results for 1904, it is to be noted that the dividend of the Tecklenborg company has declined from 12 percent in 1903 to 10 percent last year, that of the Neptun company from 8 percent to 7½ percent, and that of the Flensburg company from 11 percent to 4 percent, the reduction in the latter case being attributed to labor troubles, which largely interfered with working operations. No information is available in regard to the Elbing works of the firm of Schichau, which is a private undertaking, or in respect of the Germania Yard, which forms part of the enormous enterprise of the Krupp company. As the financial year of the other principal works has yet to be disclosed to the shareholders, namely, for 1904-05, it is impossible to give any figures for that year. But for 1903-04, it may be mentioned that the Blohm & Voss Co. distributed

7 percent as compared with 9 percent in the previous year; the Seebeck company, 5 percent as against 10 percent; the Reiherstieg company, 10 percent in both years; and the Weser company, 5 percent as contrasted with 8 percent in 1902-03. It is estimated that eleven of the leading firms employ approximately 38,000 workers, and seven of the former are builders of warships of one kind or another.

It has already been stated that the present year is a record period in regard to the tonnage under construction or on order for the principal shipping companies. Some of the builders, when recently asked for information as to the extent of activity prevailing, either declined to vouchsafe particulars or declared they were well employed, while others were less reserved and specified the tonnage under construction. But the shipping companies themselves have been less reticent, inasmuch as they have, generally speaking, afforded information in relation to the identity of the builders, the tonnage and names of the vessels, and the anticipated time of completion. As the only point of interest in this connection relates to the volume of new constructions, it may at once be stated that twelve shipping companies show a total of 315,000 tons on order or in course of building. This total is exclusive of warships and of smaller vessels for the less important shipping companies in Germany. Of the total the Hamburg-American Steamship Co. is represented by 92,000 tons, the North German Lloyd by 72,000 tons, the Cosmos company by 30,000 tons, the Hansa company by 28,000 tons, the German Australian company by 21,000 tons, and the East Africa line by 12,000 tons; whilst the balance is accounted for by orders placed by six other shipping companies. A large amount of the new tonnage owes its origin to the sale of many steamers for the purpose of the late war in the Far East. In fact, although the age of the steamers belonging to the two principal German shipping companies, if not to others, does not exceed an average of between six and seven years, the war has afforded them an opportunity of bringing their merchant fleets even more up to date than has hitherto been the case. In other instances the new tonnage may be attributed to natural expansion of the less important companies and the desire to launch forth in other directions in order to secure a greater hold upon the shipping traffic of the world. The present indications, then, betoken prosperity, which will become accentuated in the event of the production of a new naval ship building program in Germany and the probable receipt of warship orders from Russia; while the development of the German ship building yards, especially of two firms whose schemes are at present attracting attention, will tend to increase their competitive capabilities in the demand for new construction in the future. British builders receive few orders from Germany now as compared with twelve or thirteen years ago, and they may expect the business entirely to cease in the near future, except where abnormal conditions prevail.

The Barneson-Hibberd Co., which operates the fast steamer H. J. Concoran (a stern-wheeler) between San Francisco and Mare Island and Vallejo, intends to improve its already good service by the addition of a steamer recently bought in the East. The new boat is handsomely equipped and is considered an unusually fine craft for bay and river work. That she is a fast boat is shown by the fact that the route on which she is now engaged requires a speed of 19 knots per hour. Captain Barneson will bring the vessel from the East to the Pacific coast.

The Hitchings-Joyce ship yard, Hoquiam, Wash., has been awarded the contract to build a large steamer for J. O. Davenport & Co., of San Francisco. The steamer will be 172 ft. over all, 160 ft. keel, 36 ft. beam and 13 ft. deep.

PRESIDENT ROOSEVELT ON THE PANAMA CANAL

President Roosevelt is urging in the strongest terms the necessity for a plan for the construction of the Panama canal. In his recent remarks to the Consulting Board of Engineers on the Isthmian Canal Commission, he said:

"What I am about to say must be considered in the light of suggestion, not as direction. I have named you because, in my judgment, you are especially fitted to serve as advisors in planning the greatest engineering work the world has yet seen, and I expect you to advise me, not what you think I want to hear, but what you think I ought to hear. There are two or three considerations which I trust you will steadily keep before your minds in coming to a conclusion as to the proper type of canal. I hope that ultimately it will prove possible to build a sea level canal—such a canal would undoubtedly be best in the end, if feasible; and I feel that one of the chief advantages of the Panama route is that ultimately a sea level canal will be a possibility.

"But, while paying due heed to the ideal perfectibility of the scheme from an engineer's standpoint, remember the need of having a plan which shall provide for the immediate building of a canal on the safest terms and in the shortest possible time. If to build a sea level canal will but slightly increase the risk, then, of course, it is preferable. But if to adopt the plan of a sea level canal means to incur hazard and to insure indefinite delay, then it is not preferable. If the advantages and disadvantages are closely balanced I expect you to say so. I desire also to know whether if you recommended a high level multi-lock canal, it will be possible after it is completed to turn it into or to substitute for it in time, a sea-level canal without interrupting the traffic upon it. Two of the prime considerations to be kept in mind are:

"1. The utmost practicable speed of construction.

"2. Practical certainty that the plan proposed will be feasible; that it can be carried out with the minimum risk.

"The quantity of work and the amount of work should be minimized so far as possible.

"There may be good reason why the delay incident to the adoption of a plan for an ideal canal should be incurred, but if there is not, then I hope to see the canal constructed on a system which will bring to the nearest possible date in the future the time when it is practicable to take the first ship across the isthmus, that is, which will in the shortest time possible secure a Panama waterway between the oceans of such a character as to guarantee permanent and ample communication for the greatest ships of our navy and for the largest steamers on either the Atlantic or the Pacific.

"The delay in transit of vessels owing to additional locks would be of small consequence when compared with the shortening the time for the construction of the canal or diminishing the risks in its construction.

"In short, I desire your best judgment on all the various questions to be considered in choosing among the various plans for a comparatively high multi-lock canal, for a lower level with fewer locks, and for a sea-level canal. Finally, I urge upon you the necessity of as great expedition in coming to a decision as is compatible with thoroughness in considering the conditions."

PROTEST AGAINST LOG RAFTS

A protest is entered editorially in the *Engineering News* against the practice of towing huge rafts of logs for long distances on the ocean, for the reason that the logs

may and often do constitute a serious menace to navigation. The paper says:

"It is admitted that any such raft runs a large risk of going to pieces should it meet a severe storm in its passage across the Pacific; but the profit through the saving in freight charges is so great that the company is willing to take this risk. This may be all right from the company's standpoint, but it ignores entirely the risk to shipping which would result from the dispersal of a great mass of drifting logs in the Pacific ocean. There is good reason to believe that a considerable portion of the unexplained losses at sea—those mysterious cases where a vessel starts out on a voyage and never reaches port, and no record is ever found of what befell her—are due to collisions with derelicts or floating wreckage. Doubtless we shall soon reach a time when, for the safety of ocean-going travel and traffic, international action will be taken for the systematic destruction of derelicts and for the enactment of laws and rules to prevent the abandonment of vessels without taking measures for their sinking. Until such international measures are taken, however, it should be—and we believe it is—within the power of any nation to prevent its own citizens from sending out on the high seas vessels or other floating structures which are not sound and seaworthy, and which are therefore likely to become a menace to navigation."

PROOF THAT ENCOURAGEMENT IS NEEDED

At the annual meeting of the Boston Steamship Co. the report submitted by the directors showed a net profit of only \$21,000, against \$125,592 for the previous year. President Alfred Winsor in explaining the poor showing said:

"The chief cause of the small profits is that the steamer Shawmut, during a typhoon at Hong Kong, was driven ashore in August, 1904. While we collected from the underwriters the cost of repairs, we were not able to cover by insurance the loss of service, which in this case was about three months. If we had had the earning capacity of this ship during the time lost by this disaster, the net result of the year's business would have been about \$50,000 better. We have expended and charged to operating expenses \$81,334 for repairs on the ships. They today are in excellent condition and well kept up. The cost of the passenger accommodations has proved a wise one, and has paid a good return. Your steamers are covered by insurance to the extent of \$1,810,000. Owing to end of the war between Japan and Russia we shall be relieved from the premiums on war risks we have been obliged to carry the past year which amounted to about \$6,500. Another year's operations confirm the opinion previously expressed, that the American merchant marine in foreign trade requires some reasonable encouragement from the government. The Merchant Marine Commission will present its final recommendations to the new congress that is to assemble in December. An earnest effort will be made to secure some remedial legislation at once, and many of the leading men in Washington have expressed an especial desire that vigorous steps should be taken to upbuild American steamship lines to the markets in the orient."

The tug Frank Perry, built at the Johnston Bros. yard, Ferrysburg, Mich., is now in commission. The tug is constructed of steel and is 142 ft. long and 25 ft. beam. The engine is a fore and aft compound 22 and 44 by 36, supplied with steam from a Scotch boiler 13 ft. diameter and 13 ft. long. The Perry is one of the trimmest tugs on the lakes.

Launch of the William G. Mather

The launch of the great steamer Wm. G. Mather at the Ecorse yard of the Great Lakes Engineering Works, Detroit, last Saturday, was made an event of more than ordinary social importance. About a thousand persons witnessed the launch as the guests of the Great Lakes Engineering Works from the decks of the steamer *Pleasure* which had been chartered for that purpose.

The new steamer was christened by Miss Katherine Mather, sister of Mr. Wm. G. Mather, in whose honor the vessel was named. The launching party consisted of Mr. and Mrs. H. M. Campbell, Miss Mary Curtinius, Miss Bessie White, Mrs. C. B. King, Mr. E. W. Cottrell, Mr. George H. Russel, Mr. John R. Russel, Mr. A. C. Pessano, Mrs. J. A. Ubsdell, Mr. and Mrs. Henry Russel, Mr. and Mrs. H. C. Potter, Mrs. J. C. Hutchings, Mr. William Gerhauser, Mr. Joseph Boyer, Mr. F. E. Holt and Mr. R. E. Plumb, all of Detroit; Mr. and Mrs. T. P. Howell, Mr. and Mrs. Samuel Mather, Mr. J. H. Sheadle, Mr. Livingstone Mather, Mr. Wm. G. Mather, Mr. T. H. Geer, Mr. E. S. Page, Mr. H. W. Caniff, Mr. A. C. Dustin, Miss Katherine Mather, Mr. W. C. Richardson, of Cleveland.

After the launch the guests returned to Detroit on the steamer *Pleasure* where the launching party was tendered a banquet at the Detroit Club by the ship building company. The dinner was one of the best arranged of the series that have marked the launchings of the past year, and an element of great pleasure and sociability was introduced into it by the interposition of speeches between the courses. This feature was very successfully inaugurated by Mr. Wm. Gerhauser in proposing a toast to the ship.

Mr. Antonio C. Pessano, president of the company, who presided, regretted that Mr. Mather's lifelong friend, Peter White, was not present, and offered a toast to him at the same time calling upon Mr. Mather.

Mr. Mather strenuously objected to be classed as a lifelong friend of Peter White, because in that event he would have to admit himself to be at least 250 years old. He also referred quite wittily to the launch of the steamer *George H. Russel* at the St. Clair yard of the company some weeks ago, and said that he had been informed that the *Russel* was observed going up the Detroit river half full. He hoped that the *Mather* would be always full. He expressed his pleasure at seeing "every mother's son of the Russel family present." He also congratulated the company upon the extraordinary completeness and finish of the steamer *Peter White* which had been inspected by



MR. WILLIAM G. MATHER.

the launching party, and desired the ship building company to remember that there was a respectable sum yet due upon the Wm. G. Mather and that if the work upon her was not equal to that upon the *White*, some part of that sum might be withheld.

Mr. Pessano said that when he was especially in need of information in Cleveland he always sought out one gentleman and that, notwithstanding the number of times he had visited him, he had never come away empty handed. He then introduced Mr. J. H. Sheadle.

Mr. Sheadle said that there were two things desirable in a ship, a good builder and a good name. The *Mather* had both. He said that when a certain foreign gentleman, meaning Mr. Pessano from the ancient city of Philadelphia, had called upon him in behalf of the ship building company, he had grave doubts as to whether they could build such a ship as the *Mather*. In looking over the *Peter White*, however, all doubts had been dispelled.

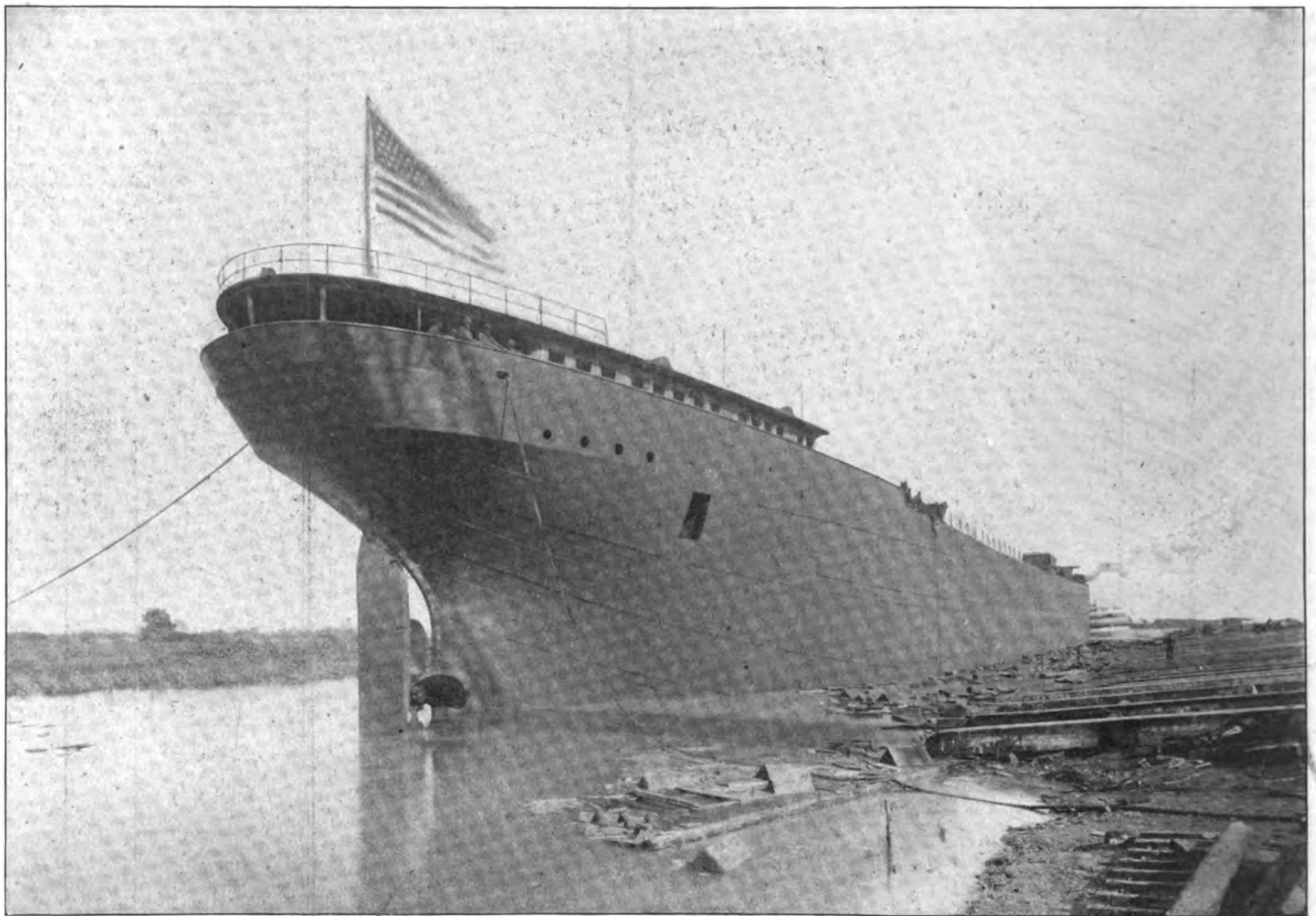
He referred to the first cargo of ore ever shipped through the Sault Ste. Marie canal from the Lake Superior country which came from the mine of the Cleveland Iron Mining Co. and was carried by the brig *Columbia*. It consisted of 132 tons, an amount which would not half fill the coal bunkers of the *Mather*. He then took occasion to read the account of the christening of the schooner *Samuel L. Mather* at Vermillion in 1877, as follows:

"A Vessel Christening.—A splendid three-masted schooner just built at Vermillion is honored with the name of our well known citizen, Samuel L. Mather, president of the Cleveland Iron Mining Co. The vessel arrived in this city a day or two since after a trial trip to Escanaba, and on Tuesday her godfather invited to her elegant cabin a large number of his friends, prominent iron and river men. A bountiful collation prepared by that royal caterer "Luce" Phillips, covered the table, and received appreciative attention from the guests. The schooner is owned by Philip Minch, of Vermillion, and cost \$34,000. She is a model of marine architecture of the following dimensions: Length of keel 162 ft., over all 167 ft., breadth of beam 31 ft. 3 in., depth of hold 13 ft. Her carrying capacity is 538 62-100 tons, new measurement. She brought down from Escanaba 965 gross tons of ore, and will carry about 40,000 bushels of grain. The builder was Isaac W. Nicholas. The entire outfit, which is said to be in all respects the most complete of any vessel that ever sailed from this port, was furnished by J. W. Grover & Sons, of Cleveland. She has wire rigging



SCENES ON THE LAUNCHING STAND.

- | | | |
|---|---|---|
| Mr. A. C. Pessano, Mr. John R. Russel and Miss Katherine Mather, Sponsor. | Mr. W. G. Mather, Miss Katherine Mather and Mr. Charles T. Harvey. | Miss Katherine Mather, Mrs. Samuel Mather and Mr. Livingston Mather. |
| Mr. George H. Russel, Miss Katherine Mather and Mrs. Samuel Mather. | Mr. Charles T. Harvey and Mr. W. G. Mather enjoying a joke. | Mr. A. C. Pessano, Mr. W. G. Mather, Mr. George H. Russel and Mr. Samuel Mather |
| Miss Katherine Mather and Mr. Pessano. | A. C. Dustin telling W. G. Mather something he evidently doesn't believe. | |



THE STEAMER WILLIAM G. MATHER IMMEDIATELY AFTER LAUNCHING.

and all the modern improvements throughout. The owner has spared no expense to make his beautiful craft one of the finest on the lakes. All the guests were lavish in their praises of her and warmly congratulated Capt. Minch upon the possession of such a vessel. She will be commanded by Capt. P. G. Minch, son of the owner. She sails in a day or two for Chicago with a cargo of coal and will go thence to Escanaba for ore, for which trade she was built."

"How ridiculous that sounds to us now," said Mr. Sheadle. "The steamer Wm. G. Mather could on a single trip carry the yield of 15,000 acres of wheat. The name Mather has been a good name for more than fifty years on the lakes and is a good name yet. It has never been connected with modern high finance so called, but has always been associated with sound business principles."

Mr. Samuel Mather being called upon stated that he was not as old as his brother and could not therefore be expected to supply the company with the lore of ancient days, but was willing to let the impression of Mather rest as it stood. In referring to his brother's remark, however, that he was glad to see every mother's son of the Russel family present, he wished to supplement it by saying that he personally was glad to see the mother's daughter too.

This pleasing reference to Mrs. J. C. Hutchings brought Wm. G. Mather to his feet and he proposed a toast to the whole Russel family, daughters and sons. "Detroit, Cleveland and Marquette," said he, "could not get along without them."

Mr. Pessano very graciously said that he would not

embarrass Mrs. Hutchings by asking for a response but would have her big brother reply for her.

Mr. George H. Russel said that it was extremely difficult to speak for the Russel family but that being the eldest son it was a duty devolving upon him. He had observed that he was getting to be known as "Old Russel."

"If every son of the Russel family was present," said he, "there would be no room for the guests. I think it is especially fine to have a boat named after Wm. G. Mather. I was off with him once for a week and we called him 'Little Chief.' He was the finest, best, most genial and most thoughtful host I ever traveled with. Samuel Mather, too, if he will permit it, I am going to be better acquainted with him as time goes on. I hope for a successful future for this great boat, for although not the longest on the lakes, she is 4 ft. broader than any. The company has tried to do well with her and I hope she will be a matter of pride, satisfaction and profit to her owners."

Mr. Pessano introduced Mr. Henry Russel as a gentleman whose French is most renowned. Mr. Russel stated, however, that Walter Russel was the only French scholar in the family. He spoke of his great pleasure in inspecting the steamer Peter White and thought her a most magnificent steamer. He paid a tender tribute also to Peter White himself, saying that of all his excellent qualities his heart was the best, and that he was at his very best when referring to members of his own family.

The dinner was brought to a close by Mr. R. E. Plumb making the point that the Mather was the only real

American ship on the lakes, in that she could not possibly go through the Canadian locks but would have to use the American locks solely. Mr. Charles T. Harvey, who built the first American canal at Sault Ste. Marie, was present to see the Mather go overboard.

The steamer Wm. G. Mather is 533 ft. over all, 513 ft. keel, 60 ft. beam and 31 ft. deep. Her distinction, as stated, lies in the fact that her beam is 4 ft. wider than any ship now on the lakes. The depth of the water ballast tank at center is 5 ft. 6 in. and the width of side tanks is also 5 ft. 6 in. She is built on the arch girder system with straight hopper sides and has thirty-one hatches spaced 12 ft. centers with wooden covers. She will have a carrying capacity of 10,000 gross tons on 19 ft. draught. Her bunker capacity will be 350 net tons and

fitted with piston valves and the low pressure with treble ported slide, all worked by link gear. The air pump is worked by beam from the high pressure crosshead, and is 38 in. diameter, 15 in. stroke. The bilge pump and cold water pump are also worked from air pump beam. The boiler feed pump is independent, single, with compound steam cylinders, and is of the end-packed, pot-valve type.

The thrust bearing is of the horseshoe type with six adjustable collars. The tail shaft is enlarged in stuffing box to allow of withdrawal inboard without disturbing thrust bearing. The propeller is sectional, four-bladed, taper fitted to shaft.

All parts of the engines are made to standard gauges and templets, and like parts are perfectly interchangeable. Everything commercially possible to insure durability

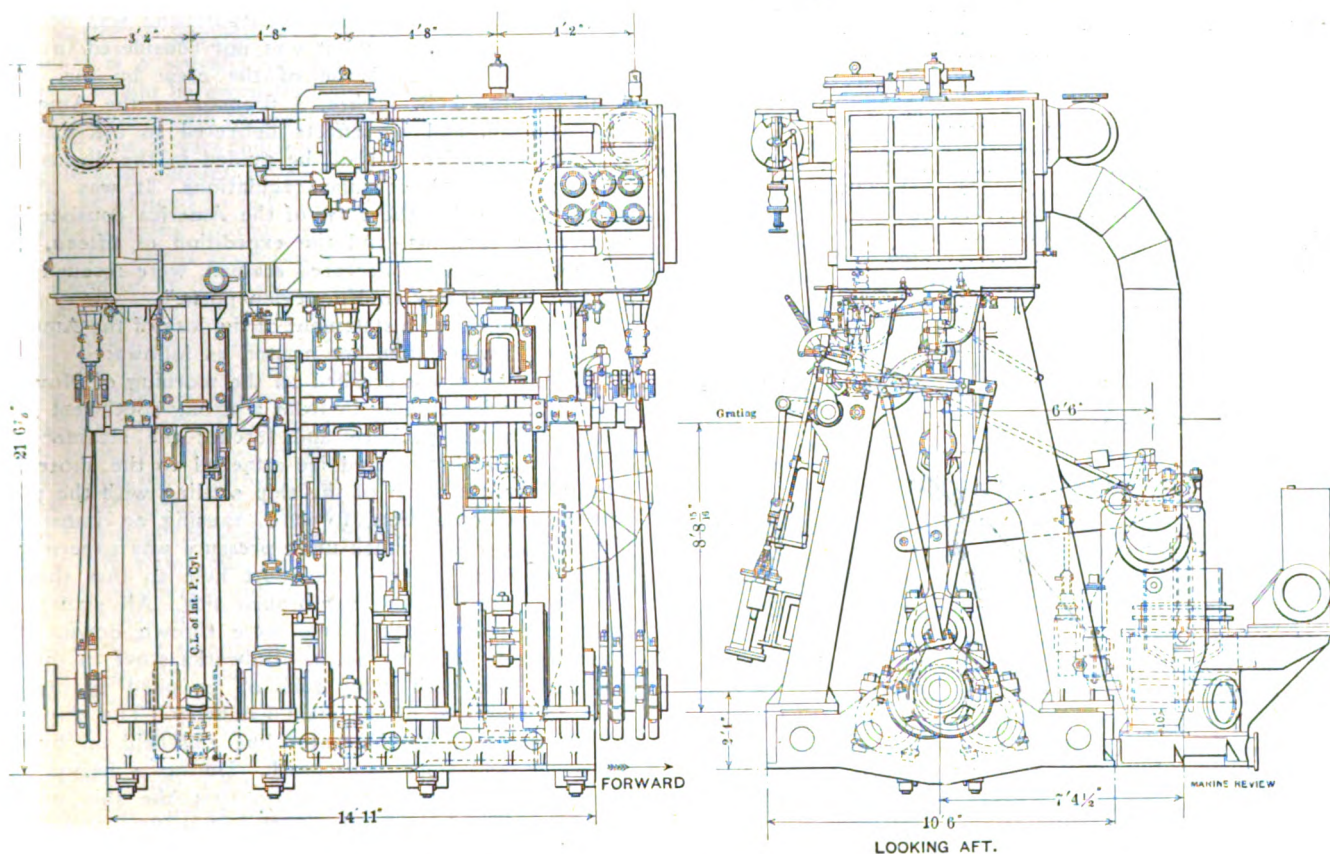


DIAGRAM OF THE ENGINES OF THE STEAMER WILLIAM G. MATHER.

her water ballast tanks will hold 61,000 tons. She is designed for a speed of eleven miles per hour loaded. She is fitted with a Hyde steam windlass, Hyde steam capstan and Hyde steam steering engine operated by Brown telemotor.

Her cabin accommodations will not be excelled by those of any steamer on the lakes. The passenger accommodations include six staterooms, a parlor and an observation room with pilot house on top. A private dining room for the use of passengers is also provided in the after deck house.

The propelling machinery of the Mather consists of one set of triple-expansion engines with cylinders 24½, 39 and 67 in. diameter by 42 in. stroke and supplied with steam by two cylindrical boilers 15 ft. 6 in. diameter and 12 ft. long over heads, at a pressure of 175 lbs. The engines are arranged with the low pressure forward, high pressure in the center and intermediate pressure aft. The high pressure and intermediate pressure are

and resist wear has been adopted; the crank pins are of high carbon compressed steel; the crosshead pins and various smaller pins and bearings are of low tool steel; piston rods, crosshead pins, crank pins, valve stems, piston valves and many other parts are ground to a finish, producing not only better working surfaces but absolutely accurate work.

The condenser is of the jet type, of the pattern designed several years since by Mr. H. Penton, chief engineer of the Great Lakes Engineering Works, and now generally used.

The boilers are fitted with three Morrison furnaces each, with separate combustion chambers. The furnaces are of the removable type with flanged ends. A system of induced draft is installed, with the usual air heaters and fan. Hodge flue blowers are fitted in all combustion chambers. A steam circulator is fitted in the bottom of each boiler, by means of which a dead boiler can be brought to steam temperature even before fires are

started. Two elevators are fitted in fire hold for discharging ashes overboard.

Some of the leading dimensions and other particulars follow:

Engines:

Cylinders—Diameter..... 24½ in., 39 in., 67 in.
Cylinders—Stroke..... 42 in.
Piston Rods—Diameter..... 5¾ in.
Crosshead pins—Diameter..... 6½ in.
Crosshead pins—Length..... 9 in.
Crank pins—Diameter..... 13 in.
Crank pins—Length..... 13 in.
Crank shaft—Diameter..... 13 in.
Thrust shaft—Diameter..... 13 in.
Tail shaft—Diameter..... 13 in.
Air Pump—Diameter..... 38 in.
Air pump—Stroke..... 15 in.
Feed pump—Diameter—Steam..... 8 in. & 14 in.
Feed pump—Diameter—Water..... 7½ in.
Feed pump—Stroke..... 16 in.

Boilers:

Number..... Two.
Diameter..... 15 ft. 6 in.
Length..... 12 ft.
Working pressure..... 175 lbs.
Furnaces—Number..... Three.
Furnaces—Diameter, inside..... 46 in.
Tubes—Number..... 400.
Tubes—Diameter..... 3 in.
Tubes—Length..... 8 ft. 6 in.
Heating surface..... 3,091 sq. ft.
Grate surface (5 ft. 3 in. bars)..... 61 sq. ft.

Capt. J. M. Johnston will sail the Mather and Thomas Durkin will be first engineer.

LOSS OF THE AMERICA

Mr. E. S. Cunningham, United States consul to Bergen, Norway, has filed the following report with the secretary of state on the loss of the Ziegler arctic exploration steamer America in Teplitz bay, January, 1904. The report is as follows:

"The Terra Nova arriving at this port on the morning of the 17th instant with the crew of the S. Y. America on board, brought me report of the loss of the America, New York, owned by Mr. Wm. Ziegler, and commanded by Edwin Coffin, while anchored in Teplitz bay in January, 1904. The yacht was engaged in arctic exploration and she was crushed on Nov. 21, 1903, to such an extent that her complete loss was fully apparent to her commander, so she was anchored and the crew were all on shore at the time of her disappearance, so that none of them were lost. The vessel was a complete wreck. Some of the supplies of the expedition had been landed and were safe. I beg to enclose a copy of the report of the commander as to her damage and disappearance.

The crew of S. Y. America and the members of the expedition who were passengers on the America were rescued on July 28, and brought to ports of Norway by the Terra Nova, also owned by Mr. Ziegler, and which was sent out as a relief or rescue ship of the second Ziegler Polar Expedition during this summer. The rescue party was organized and headed by Mr. W. S. Champ, as Mr. Ziegler's personal representative, and the vessel was commanded by Kjeldsen, a Norwegian, with a crew composed principally of Norwegians. Since the vessel was owned by an American, I suppose greater details of rescue need not be given by me.

"The register of the S. Y. America was saved and was turned over by the master to Mr. Champ, as Mr. Ziegler's representative, and in accordance with paragraph 330, consular regulations, I requested that it be delivered to

me for transmission to the treasury department, but Mr. Champ insisted that it being a yacht's register he should retain it and besides 'reason of sentiment he desired to retain it.' The only concession Mr. Champ would make was, should the treasury department decide that I was correct in my contention, that he would deliver it to the proper authorities upon notice of such a decision, and in obedience of which he gave me a written agreement to this effect, and he should be addressed 60 Liberty street, New York city.

"The America crew was discharged and paid off by me and certificates issued in accordance with paragraph 209, consular regulations, and each member of the crew was paid in full to Sept. 1, from date of shipping, and was provided a second-class transportation to New York by Mr. Champ, representing Mr. Ziegler's estate. The question of extra wages and transportation was decided upon by Mr. Champ, and it was not considered in connection with the discharge of the crew by me. The death of Sigurd B. Myhre, a fireman on the America, was reported, and his effects delivered to me, and he being a Norwegian, I shall be guided in the disposition by paragraph 258, consular regulations. It was of interest to note that the crew of the America consisted of twenty-four persons, and the expedition of fifteen, and all, saving the above deceased seaman, were rescued and brought back safely to Norwegian ports."

There is enclosed a statement of the loss of the America by Capt. Edwin Coffin, her master, as follows:

"The America was crushed on the morning of Nov. 21, 1903, by the ice coming in from a strong southwest gale, bringing in the pack-ice and forcing the steamer out on top of the heavy land ice attached to the shores of Teplitz Bay, the stern of the ship settling with the pressure which came from forward, causing an immediate leak. Shortly after much more pressure was experienced amidship which stove in the port hole so that the ice could be seen through the broken side. All stanchions under the lower deck beams were thrown down. The lower rigging all hung slack. Bulwarks stove in on the starboard side with many tons of ice piled up on the main deck abreast of the main hatchway. The ship was full of water up to the water line and held up by the ice which had gone underneath. During a heavy gale of six days' duration in January, 1904, the ship wholly disappeared and no part of the ship was ever seen again."

GERMAN SHIPPING

Editor *Marine Review*: The North German Lloyd has arranged a new service of direct cargo steamers between Bremen and Philadelphia, with a through connection to Savannah, sailing from that port with an export cargo direct to Bremen. Regular times of sailing and ports of call will be observed. Three steamers, the America, Hansa and Europa, will be on the route. No passengers will be carried. The Hansa sailed on Sept. 7 from Bremen on the first trip of the new service.

There has been a marvelous increase in the number of seagoing ships registered at Hamburg in the past twenty-five years. At the end of 1880 there were 489 vessels with a total capacity of 322,135 registered tons. At the end of 1904, the figures were 1,021 vessels, of 1,265,842 tons registered capacity. In 1880 the steamers numbered 128, of 99,153 tons aggregate; in 1904, 601 steamers, with a total capacity of 992,274 registered tons. Therein we see one of the results of the world's change of shipping from sail to steam.

WALTER J. BALLARD.

Schenectady, N. Y.

FOREIGN VESSELS IN PANAMA TRADE

Editor *Marine Review*: In connection with the articles appearing in the issues of Aug. 17 and 31 of the *Marine Review*, regarding the employment of foreign vessels to transport merchandise for the construction of the Panama canal, will you kindly allow space for a few words?

Through the policy of our government, protection is extended to almost every class of business except shipping, which is brought into direct competition with vessels flying foreign flags, which are built cheaper, pay a lower rate of wages, and which, in many cases, are assisted by a subsidy from their home governments. Under these conditions, it is evident that it is not possible for American vessels to compete profitably with foreign vessels, other conditions being equal; and where it is in the power of our government to extend protection, as in the matter of carrying material from one American port to what is practically another American port, American vessels should be given the benefit, and the coasting navigation laws should be considered as applying to the case. Further, the private individual is usually obliged to pay a considerable percentage more for commodities than he would be obliged to pay for the same articles in foreign countries, owing to our protective policy. Why should the United States government be exempt from the action and effect of its own laws? That this is recognized to a certain extent is proven by the action of the navy department in accepting bids of \$6.50 per ton, submitted by American vessels for carrying coal from Newport News to the Philippines, whereas bids as low as \$4.30 were submitted by owners of foreign vessels. Why should not the same policy be pursued in the present case?

Referring more particularly to the article appearing in the *Marine Review* of Aug. 31, certain erroneous impressions that might be conveyed thereby should be corrected. The article states that "the California Shipowners' Association named a rate of \$12 per M. feet and would not consider anything less." If, by the "California Shipowners' Association," is meant the Shipowners' Association of the Pacific Coast, this statement is a very misleading one, as the Shipowners' Association of the Pacific Coast neither owns nor manages vessels, and is not in the market for charters. The association does issue a weekly freight circular, quoting what the board of directors consider fair rates to various ports (Panama, among others) for the guidance of its members, but members are not bound to these rates and are at liberty to fix vessels at any rate which is satisfactory to them. In fact, any such combination for the fixing of rates as is intimated to exist by the article in question would be illegal, being contrary to the interstate commerce laws. As evidence of the fact that no combination existed between the members of the Shipowners' Association, the schooner E. B. Jackson, belonging to one of its members, was chartered by J. J. Moore & Co., of which Mr. J. J. Moore, the writer of the article in question is the president, at a rate of \$9.60 per M. feet. Other American vessels were offered at a rate considerably lower than \$12 per M.

Another concern paid \$9.60 for steamers to Panama, free from charges for wharfage, hoisting cargo, etc., amounting to about \$2 per M. feet. The uncertainty existing as to what expenses a vessel will incur at Panama has quite an effect on rates quoted for charters. Naturally the vessel owner must quote a rate which will protect him against unforeseen contingencies. As soon as these matters are definitely settled, lower rates will be quoted.

Further, the employment of foreign vessels for this business eliminates competition on lumber to a certain

extent, as it makes it impossible for the owners of various mills along the coast to offer bids. This arises through the fact that foreign vessels, which are of deep draught can only reach a limited number of mills to load, and the owners of mills situated at bar harbors, being unable to use these deep-draught vessels, are unable to bid. To quote from the "Hearings before the Merchant Marine Commission" (page 1,284): "Geographically, the Pacific Coasts of California, Oregon and Washington extend over 1,000 miles, and in all that distance there are but four harbors into which deep-draught vessels can enter—namely, San Diego, San Francisco, Columbia river and Puget sound. The smaller harbors, such as San Pedro, Humboldt bay, Coquille river, Coos bay, Umpqua river, Siuslaw river, Tillamook, Willapa harbor, Gray's harbor, and many ports inside the entrances to Puget sound and Columbia river, are all exporting centers of more or less importance. On account of being unapproachable to the deep-draught foreign vessel, these ports cannot enjoy her low freight offering, only in so far that the foreign vessel makes the rate for the lighter draft, coast-owned vessel that has been expressly built to trade in bar harbor and shoal-water ports. This class of vessel, being necessarily of small carrying capacity, at best finds it extremely hard to hold its own against the foreign subsidized ships; but when, in consequence of an overplus of these ships being on our coast, and the average freight dropping a shilling or two, the coaster, rather than undertake a losing voyage, goes out of service, many valuable exporting centers are deprived of the means of transportation and a general cessation of development in these sections is the result."

Money paid to foreign owners is almost wholly taken out of the country, for they, so far as possible, dock, paint, make repairs and buy all stores in their own ports, their policy being to take all and give nothing. It is of vital importance that our merchant marine be fostered, our government professes an earnest desire to aid in doing so, and the giving to American owners the business with Panama and the Philippines affords an opportunity of extending much needed assistance without the payment of one cent of subsidy.

This morning's papers report the chartering of four foreign tramp steamers for Panama, while numbers of American sailing ships are seeking freights; our own citizens are paying taxes to provide the foreigners with business. Considering the fact that the canal is being built by the American people and will be paid for with American money, is it not good public policy to pay a higher rate of freight, keep the money in this country, and furnish employment for our American shipping, rather than assist in still further diminishing the number of vessels flying the American flag?

Respectfully yours,

SHIPOWNERS' ASSOCIATION OF THE PACIFIC COAST,

By R. S. Clarke, Secretary.

When the improvements to the South Chicago plant of the American Ship Building Co. are finished the yard will be among the most complete on the lakes. As this yard will build the two new 600-footers for the Pittsburg Steamship Co., it will employ about a thousand men during the winter.

Dredge No. 4, belonging to the Lake Erie Dredging Co., of Buffalo, foundered in Lake Erie, near Dunkirk, last week. She was in tow of the tug Cascade, but the tow line broke in the gale, the dredge rapidly filling and sinking.

SIR HENRY BESSEMER

Engineering of London has published the autobiography of Sir Henry Bessemer, to which the *Engineer* also of London, has devoted a comprehensive review. The life of Bessemer is of great interest to the whole civilized world, for no man did more in a practical way to alter the mode of life. The *Engineer* in its review says:

Biographies are sometimes amusing, often dull, never complete. More is left unsaid than said. The autobiography is usually untrustworthy; but it possesses the great advantage that it tells us what the author thought himself and of himself. We see things as he saw them; events assume a peculiar individuality as narrated by him. In most cases the story told is honestly told. The teller does not of malice pre-pense assert that which is not true. Often, indeed, an autobiography is written with the utmost candor; but candor and fact are not inseparable companions. Those who best knew Sir Henry Bessemer personally will be the last to assert that his autobiography sets before the world more than a sketch of the man. We have to gather an idea of what he was from more or less detailed stories of his inventions. Modesty, possibly, restrained him from writing much about himself.

Henry Bessemer was a very remarkable man placed in very unusual surroundings. He held the unique position of a surprisingly able inventor with a brain of magical fertility and a sufficiency of money to spend as he pleased. He was entirely untrammelled by technical education or an orderly knowledge of physics. He was inquisitive to the last degree. The business of every maker of anything was his business. The key to his whole life may be summed up in a few words. If he saw anything that interested him, he wanted to know how it was made, and having, with indefatigable industry found out, he at once jumped to the conclusion that the method of production was not as good as it ought to be, and thereupon he set out to improve it. His self-confidence was absolute. He had, as a rule, no previous acquaintance with the matter in hand to interfere with his movements. The fact that he knew nothing whatever about the subject never affected his action in the slightest degree. In one place he writes: "How often it has occurred to me, and how often have I expressed the opinion that in this particular competition—as in many other previous cases—I had an immense advantage over many others in dealing with the problem under consideration, inasmuch as I had no fixed ideas derived from long-established practice to control and bias my mind, did not suffer from the too general belief that whatever is right. Hence I could, without check or restraint, look the question steadily in the face, weigh without prejudice or preconceived notions all the pros and cons, and strike out fearlessly in an absolutely new direction if thought desirable." It is, of course, certain that most of the great work of the world has been done by men, who, according to modern ideas, were wholly uneducated. But it ought not to be forgotten that these men possessed genius—that peculiar quality which enables such men to effect combinations, to design machines, and to contrive methods which, being entirely new, could not be the result of any previous instruction or derived from experience. As we proceed it will be seen that Bessemer was possessed of talents such as few other men have possessed, and he was no doubt quite right when he said that it was a direct advantage to him to know nothing about a subject with which he proposed to deal.

Sir Henry Bessemer's autobiography begins in the normal fashion with an account of his parentage and birth. His father was born at 6 Old Broad street, and at the age of eleven was taken to Holland by his parents, who settled there. At the age of twenty-one he went to Paris; at the age of twenty-six was made a member of the French Acad-

emy of Sciences, was engaged at the Paris Mint, and while there invented the well-known copying or portrait lathe, by means of which medallion dies can be reproduced from an enlarged model. When Sir Henry attributed the invention of this lathe to his father, he had evidently forgotten Watt's copying machine. During the French revolution, Mr. Bessemer had to fly from France, and turned his knowledge of working in precious metals to such good purpose, that he was able to realize a small fortune. He purchased a little landed estate in the village of Charlton, near Hitchin, in Hertfordshire, and there Henry Bessemer was born in 1813, on Jan. 19. After a time the elder Bessemer undertook the work of cutting matrices for Caslon's type foundry. Henry Bessemer seems to have been left much to himself. His father gave him a beautiful Holtzappel lathe. In the type foundry he learned a good deal about the behavior of melted metals. At the age of seventeen we find the first example of that characteristic to which we have already referred. "In the course of my ramblings I had met with an Italian who had shown me several boxes full of plaster casts of the most beautiful medallions. I selected a number of them with the intention of casting them in metal, an occupation in which I took a deep interest at that time." But his medals led to something else, and we have next the whole story of Bessemer's invention of a method by which he reproduced in type metal the most delicate flower.

The whole story is too long to be reproduced here. The flower was molded in very fluid plaster of Paris. When it had set, the mold was gradually heated until the flower was burned. The ashes were then blown out and the metal poured. The whole process was a failure, as the delicate casting was always broken in the attempt to remove the mold. The difficulty was got over by what may be termed an inspiration or superhuman ingenuity—which the reader pleases. The outer portion of the mold was made of unburned blue lias, ground to a fine powder, and mixed with a small quantity of pulverized brick. The plaster of Paris then represented but a small part of the mold, and in the furnace, when the flower was being reduced to ashes, the lias stone was converted into lime, which could be easily dissolved by adding water and slacking it. Bessemer used a red-hot mold in some of his casting operations. He seems to have known nothing of the fact that this principle had been practiced in India from time immemorial. The whole process of casting chain bangles, with loose links, was described several years ago by Mr.—now Sir Casper—Clark, of South Kensington Museum, in a paper read before the Iron and Steel Institute. But this, of course, in no way detracts from Bessemer's originality.

We have not space to dwell on the interesting episode in Bessemer's life when he invented a method of preventing fraud in the sale of deed stamps. At this time, or rather some time before it, he became, he says, aware of some curious facts regarding plumbago. "Just then," he tells us, "the enthusiasm of the amateur was fast giving way to a more steady commercial instinct, and I let no opportunity slip of improving my position, but I felt that I was still laboring under the disadvantage of not having acquired some technical profession. With the exception of my card embossing and die making business, I had nothing to depend on. . . . I invariably made myself believe that as soon as I could strike some good vein I should work it to its full capacity, and not turn aside after mere novelties." We have already pointed out that Bessemer's curiosity was infinite, and he plunged with avidity into inquiry about the plumbago mine of Borrowdale. In those days pencils were made by sawing slips out of plumbago blocks, and the waste was enormous. Bessemer felt that he could do better, and invented a system of pressing plumbago dust into solid blocks. He sold the invention for £200. In the present day all pencils are made

by reducing plumbago to dust, mixing it with a small quantity of glutinous matter and expelling it in a pasty state by hydraulic pressure through small orifices, just as lead pipe and lead wire are squirted. We can do no more than allude to his type founding machine and type composing machine. An admirable instance of the extraordinary inventive powers of the man, or to be more exact, of the instinct which enabled him to overcome difficulties, is supplied by the chapter in which he describes the way in which he produced Utrecht velvet, which is a material with a deep pile standing up in a pattern from a flat woven surface. Nine persons out of ten think that the pattern is produced by cutting away a portion of the pile. It is really made by stamping with hot dies. Cotton velvet had been made in this way for some time, but a firm of decorators—Messrs. Platt, of Bond street—desired to imitate some splendid old specimens of figured Genoa velvet with a satin ground. Mr. Bessemer's fame as a die maker led them to apply to him, and he took the subject up at once, and failed. No amount of pressure or treatment would keep the pile lying down permanently. The pile of Utrecht velvet is made of a very harsh, stubborn wool, specially intended to stand hard wear. Bessemer's explanation of how he attained success we give in his own words:

"I began to fear that I should be no more successful than others in dealing with this material. Further consideration, however, and a little study of the properties of hair and wool, led me to the idea that these substances were really of the nature of horn; and this material, I knew, was capable of semi-fusion at high temperatures, and was in that condition suitable for being molded into various ornamental shapes, which permanently retained cold the forms thus impressed on them in their heated state. I now felt that I was on the right scent, and believed that if I could rapidly submit the material to a very high temperature, and then remove it away as quickly, a partial fusion of the part in contact with the hot surface of the die would take place, and produce a glossy surface like satin, which would never stand up as pile. I had no sooner got this view of the matter than I took measures to put it to a practical test. The result went to show that by maintaining the metal surface which was in contact with the velvet at a very high temperature for a short and definite period, and acting under a carefully regulated amount of pressure, the process could be made a perfect success. These experiments also proved that the temperature must be so high as to produce a semi-fusion of the wool, and that if continued for a fraction of a minute too long the fabric would be destroyed."

For details we must refer our readers to the book before us. A machine was made, and for a long time Bessemer was paid six shillings a yard for passing the velvet through the rolls. Ultimately a Banbury firm making Utrecht velvet bought the whole of the plant, and by degrees the cost of embossing was brought down to one penny per yard.

It will be seen that so far Bessemer had been fairly successful in a pecuniary sense. He had a very close friend, Mr. Richard Allen, and Bessemer married Miss Allen, at what date does not appear. Indeed, all through this book the dates of events are regarded as trivial matters of no consequence, and we jump from period to period in a very puzzling fashion. However, the marriage was in every way a success. We have said that Bessemer was an inventor with sufficient money to carry his ideas into practice, and we come now to that invention which made him a rich man, bringing him in as it did a large income for many years. The whole story of the invention of bronze powders is told in detail in Chapter V. Its inception was the result of that extraordinary curiosity to which we have had occasion already to refer. He bought some "gold powder" to illuminate an inscription in a portfolio of paintings of flowers executed by his sister, who was an excellent artist. He tells us that he was greatly

surprised that he had to pay at the rate of seven shillings per ounce for it, and at once began to puzzle his brains to know how it was made. He tested the powder with acid and found there was no gold in it—it was brass, and nothing but brass. "Here was powdered brass selling at £5 12s per pound, while the raw material from which it was made cost probably no more than sixpence. It must surely, I thought, be made slowly and laboriously by some old-fashioned hand process, and, if so, it offers a splendid opportunity for any mechanic who can devise a machine capable of producing it simply by power." Then began a long struggle, and at last he found out that the reason why bronze powder shines is that it is really composed of tiny flakes like the feathers on a butterfly's wing. No finer example of inductive reasoning on a technical subject is to be found than the contents of this chapter. At last the necessary machinery was made, all the drawings being Bessemer's own work. As no patent would be of use, the strictest secrecy was observed, Bessemer, Allen, and Bessemer's two sons, being alone in the secret. An old mansion known as Baxter House, standing in its own grounds not far from St. Pancras Church, was rented on a long lease, and the factory was built in the garden, each different machine worked in a room by itself secured with a Chubb lock, and each machine was, besides, covered with a case which must be broken open by those who did not possess the key. Here we quote once more:

"It has often been remarked that the unforeseen is always sure to happen, and thus it was in reference to the intense and ceaseless noise in No. 2 room, where thirty pieces of solid brass were being simultaneously operated on at a very high speed, each piece throwing off from its respective surface some 2,000 to 3,000 fine needle-like filaments per minute. These fell in a continuous shower, and became so felted and interlaced that it was not safe to attempt to lift any portion with the naked hand; for with the slightest pressure the hand was pierced, and dozens of these fine pieces, three-eighths of an inch in length, entered the skin and were found sticking to the fingers in every direction, like the spines on a prickly pear, or the thorns on the stem of the rose. These needle-like pieces owed their form to the intense vibration of the machine, and each one of the millions of filaments, as it was forcibly severed from the parent mass, uttered its shrill protest and helped to swell the fearful chorus. Let those who have, happily, never heard the machine in question imagine the screech of a hundred discordant fiddles, accompanied by the piercing screams of as many locomotives, all bottled up in a small room. These shrill sounds reverberating from floor to ceiling, until the very atmosphere seemed thick with the ceaseless roar, and the human voice at its highest pitch was entirely lost and inaudible. This was a result I might reasonably have anticipated, knowing as I did what the machine had to do, but in reality it never crossed my mind. Double doors with haize were found necessary to deaden the sound, and prevent its penetrating into the main building, while the machine itself was doomed henceforth to work in absolute solitude."

These rent filaments were next passed through rolls, which reduced them to flakes; and here we have again an instance of Bessemer's extraordinary instinct for getting out of difficulties. It was found that the filaments in going through the flattening rolls, became felted together and came out as a thin sheet of brass. This difficulty was entirely overcome by adding about three drops of olive oil to every pound of filaments. For the final details of one of the most ingenious processes ever devised we must refer our readers to the book itself.

For the account of the sugar cane press which he invented, which got him the gold medal of the Society of Arts, and was never used commercially, we must refer our readers to the autobiography. We must follow the same course with ref-

erence to his researches in the production of glass. He tells us that he put up in 1847 the first open-hearth furnace for making glass, thus anticipating Dr. Siemens by many years. Siemens took out his first patent in 1862. Bessemer patented a system of making plate glass by pouring it in a continuous stream between rolls, and he sold his rights to Mr. Lucas Chance, of Birmingham, for £6,000.

We come at last to the invention of the Bessemer process, which revolutionized the manufacture of steel all over the world. As usual, Bessemer knew nothing about the metallurgy of steel and iron. During the Crimean war he took out a patent for a system of causing the rotation of elongated projectiles by discharging a portion of the powder gas through them in such a way as to set up a recoil turbine action. The invention was brought almost by accident before the Emperor of the French, and experiments were carried out. These are of no particular interest now. They were made in the park at Vincennes. The projectile rotated all right, but Commandant Minie doubted that any cast iron gun could stand the strain. "This simple observation," wrote Bessemer, "was the spark which has kindled one of the greatest industrial revolutions that the present century has to record, for it instantly forced on my attention the real difficulty of the situation. How were we to make guns that would be strong enough to throw with safety these heavy elongated projectiles?" After recounting what passed through his mind during the journey home from Paris, he says:—"My knowledge of iron metallurgy was at that time very limited, and consisted only of such facts as an engineer must necessarily observe in the foundry or smiths' shops; but this was in one sense an advantage to me, for I had nothing to unlearn. My mind was open, and free to receive any new impression, without having to struggle against the bias which a lifelong practice of routine operations cannot fail more or less to create."

Chapter XI is devoted to the genesis of the Bessemer process. From first to last the subject has been surrounded with controversies. Any attempt to deal with these now could do no good. We prefer to indicate the views held by Bessemer, and the characteristics of the history he has written. But it must not be forgotten that there are two sides to every question; and it could hardly have happened that any single inventor would have revolutionized an industry, on the one hand unaided, and on the other unrivalled. Bessemer tells his own story in his own way, and to this we shall, for the present, confine our attention.

He had learned that Fairbairn and others had attempted to toughen cast iron by adding wrought scrap in the cupola, with the result that they produced a species of white cast iron, contaminated with sulphur. Bessemer used a reverberatory furnace—a kind of puddling furnace in fact—and in this he melted good pig iron, and added blister steel bars made from pure Swedish billets. A very high temperature was needed, and horizontal jets of pure air were introduced through the bridge close to the surface of the melted metal to secure better combustion. It was found that these air jets decarburized the metal, and the amount of carbon left in the charge could be regulated by the quantity of air admitted. Here we have, of course, a rudimentary open-hearth steel furnace. He claimed in a patent the fusion of steel in a bath of melted pig iron. Martin's process was patented in this country on the 18th of August, 1865. Bessemer states that it was by an accident that he discovered that cast iron could be wholly decarburized by the use of air alone. The description of this discovery, and the account of the initial experiment which followed, are too long for reproduction here. The first apparatus was a fire-clay crucible into which a pipe conveying air could be plunged. About thirty minutes' blowing converted ten pounds of gray pig into soft malleable

iron. Fuel had to be used because the heat generated in an experiment on so small a scale did not suffice to keep the metal melted. He then constructed a small vertical fixed converter provided with six tuyeres.

"All being arranged, and a blast of 10 lbs. or 15 lbs. pressure turned on, about 7 cwt. of molten pig iron was run into the hopper provided on one side of the converter for that purpose. All went on quietly for about ten minutes; sparks, such as are commonly seen when tapping a cupola, accompanied by hot gases, ascended through the opening on top of the converter, just as I supposed would be the case. But soon after a rapid change took place; in fact, the silicon had been quietly consumed, and the oxygen next uniting with the carbon sent up an ever-increasing stream of sparks and a voluminous white flame. Then followed a series of mild explosions throwing molten slags and splashes of metal high up into the air—the operations becoming a veritable volcano in a state of active eruption. No one could approach to turn off the blast, and some low flat zinc-covered buildings close at hand were in danger of being set on fire by the hot matter falling on them. All this was a revelation to me. However, in ten minutes time the eruption had ceased, the flame died down, and the process was complete. On tapping the converter with a shallow pan or ladle and forming the metal into an ingot, it was found to be wholly decarburized malleable iron."

The autobiography deals at great length with the history of the rise and progress of the Bessemer process. There are pages upon pages of unedifying controversial matter, in which our author found fault with Sir William Armstrong and the War-office, the Admiralty, and Sir N. Barnaby for not adopting his metal. The story of his first and overwhelming failure to make good steel is very graphically told, and it is to be borne in mind that at the time he censured the Admiralty and the War-office no Bessemer steel of sufficiently good quality could be made from anything but Swedish iron.

Chapter XVIII is devoted nominally to "Manganese in Steel Making." It is really a defense of his own action with regard to the inventions of Mushet and others. Rightly or wrongly, many metallurgists hold to this day that it was Mushet who made the Bessemer process a commercial success, and that to Mushet the production of cheap steel rail—Bessemer rails cost £20 to £22 per ton—was due. Bessemer gives a long list of patents taken out for the use of manganese, beginning with Reynolds, who in 1799 got a patent for the addition of oxide of manganese to the materials used for melting pig iron. But all these "anticipations" miss the point. The simple fact is that Mushet by suggesting the use of spiegeleisen, got over a mountain of difficulties; and the general use of the alloy down to the present day is the best possible evidence of its value. Much that follows is not pleasant; and, we think, after reading Bessemer's version of the whole story, that he did well to allow Mushet an annuity in his closing years. There is really nothing of scientific interest in such matters as Bessemer's fight with the Ebbw Vale Steel Co., which company, he says, proposed to stop all his operations by making a corner in spiegeleisen. But it is very amusing, and throws a good deal of light on the character of the man.

The later chapters of the book are devoted to the history of various inventions which missed success, such, for example, as the Bessemer saloon, intended to prevent seasickness. The unfortunate Bessemer steamship was designed by Sir E. J. Reed, and after making a couple of more or less disastrous trips—she smashed Calais pier on her first run—she was sold, we believe, for a cattle boat, the saloon being removed.

The duty of the reviewer begins and ends with the con-

sideration of the book with which he is dealing. We have endeavored to convey to our readers an idea of the story of his life as told by Bessemer. But a great many persons are still alive who knew the man more or less intimately. The more thorough the acquaintance the more likely will they be to detect the total absence of all reference to many episodes in Bessemer's life of considerable importance. It is perhaps well that he was so reticent. He could easily have extended this book of his life to most unwieldy dimensions. As it is we have a quarto volume of 381 pages, illustrated by no fewer than fifty full page plates and a number of small engravings. Bessemer, of course, could not refer to his fine presence, his great charm of manner, and his flow of conversation; his persuasive eloquence, and the extraordinary faculty which he possessed of not only believing that he was right, but of convincing his hearers that he was. To say that he was original and a genius, conveys very little of the truth. If the complete history of his life should ever be written, it will supply a study for the philosopher much more interesting and valuable than that of kings and statesmen, who have, after all, done less than Bessemer to alter the course of the affairs of the world.

IMPROVEMENT OF FOG HORNS

Mr. G. DeW. Green, Toronto, Ont., recently wrote to the *Scientific American* a communication on the improvement of fog horns. As it is of great interest it is here-with reproduced:

"The numerous collisions which occur between vessels at sea during the prevalence of fog, and the narrow escapes which we occasionally hear of, but which are generally kept discreetly quiet by captains and vessel owners, would seem to show that the system of fog horns as at present in use is by no means perfect or satisfactory. One defect in them is that, although the sound of a fog horn may be heard by the crew of another ship, there is no means of telling in what direction the vessel on which it is sounded is going, or even where it is, because fog renders futile all reliable calculations as to distance and direction. And again, all or nearly all fog horns, I believe, whether on vessels or on dangerous points of land, are pitched on the same note, which is also conducive to errors, which in some cases end disastrously, as, for instance, when the captain of the steamer Montreal, lying in the Straits of Belle Isle in a fog some years ago, mistook the fog horn of the steamer Lake Erie for the fog horn on Cape Ball, and steaming north to avoid the supposed danger of the Newfoundland coast crashed on to Belle Isle, when the boat became a total wreck—fortunately, without loss of life.

"Now, why should not vessel fog horns be built with a musical scale of not less than five notes, and more, if necessary. Taking the scale of C major, the notes would be C, D, E, F, G. To avoid confusion with light-house and shore fog horns, a vessel should never use less than two notes, and the order in which these notes are sounded should serve to show in what direction the ship is moving. As an example of what could be arranged:

The notes C, D, would mean 'Going due north.'
 The notes D, C would mean 'Going due south.'
 The notes C, E would mean 'Going due east.'
 The notes E, C would mean 'Going due west.'
 The notes C, D, E would mean 'Going due northeast.'
 The notes C, E, G would mean 'Going due northwest.'
 The notes E, D, C would mean 'Going due southeast.'
 The notes G, E, C would mean 'Going due southwest.'

"The intermediate points of the compass, such as NNE, SSW, etc., could all be indicated by adding another note or two to the scale. This is based on all vessels going

north and east using the ascending scale, and those going south and west the descending scale.

"There would be a little difficulty, of course, as regarding sailing vessels that had no steam for sounding their fog horns, and would necessitate their carrying a supply of horns pitched on different keys to be used by the blower in their proper order. Such, in brief, are the suggestions I would make, and should these ideas or similar ones be utilized with the result of making sea-travel safer and freer from the risks which now attend it, these few lines will not have been written in vain."

ELECTRIC POWER ON ORE ROAD

Duluth, Sept. 27.—Both the General Electric and Westinghouse Electric companies are now engaged in formulating plans for the electrification of Proctor hill, on the Duluth, Missabe & Northern road. This is a 2 percent grade for about six miles, running from the shipping docks of the company on the harbor of Duluth to the terminal and transfer yard of the company at Proctor. Loaded ore trains from the mines are run to Proctor and there taken by switch engines down to the docks. The same engines bring back empties, which are made up for the return trip to mines at Proctor yard. About 2,500 H. P. will be required for handling trains on this grade, and if arrangements are made with either company for an installation the power will be furnished by the Great Northern Power Co., which is now building its hydro-electric works at Duluth. It is not yet determined whether alternating or direct current will be used in this work.

The same companies are now working out plans for the possible electrification of the Duluth-St. Paul line of the Northern Pacific road. This line connects Duluth and Superior with Minneapolis and St. Paul, and is about 165 miles in length, with a very heavy freight and passenger traffic. With the exception of a 1 percent grade out of Duluth and slightly steeper entrance into St. Paul, the line is reasonably free from gradients. It is one of three steam lines connecting these cities and carries an immense amount of coal and package freight, as well as some grain, and runs several passenger trains each way daily.

The second project is not so sure as the first, and may not come for considerable time. The successful electrification of the Duluth, Missabe & Northern's terminal line will mean that electrical railroading will be extended to the entire length of that line, as well as both the other roads reaching from the iron ore ranges to Duluth.

Then, too, both companies, looking toward the electrification of mines and mining plants on the iron ranges of Minnesota, have had engineers in the district. These have been acquainting themselves with power plants and requirements, and noting the conditions under which work will have to be done, as well as with the class of power needed and its continuity.

Mr. Augustus Schantz, of the Detroit & Cleveland Navigation Co., says that Mr. Frank E. Kirby is working on plans for the new steamer for the company but that they are not sufficiently advanced to give exact details as yet. She will, however, be the largest passenger boat on the lakes and will have accommodations superior to any boat in similar service. Unlike the boats now plying in this service she will not be driven by paddles but by twin screws. There is no intention of equipping her with turbine engines, the route not being an advantageous one for the turbine. The new steamer will have seven decks. A novelty will be introduced in the shape of a passenger elevator. The steamer will come out in 1907.

TRADE NOTES

The Atlantic Works, Inc., Twenty-eighth street and Gray's Ferry road, Philadelphia, recently received an order for one of their B-17 adjustable bevel band saw machines from the Brown Dock Co., Jersey City, N. J.

The Allan F. McIntyre Co., Monadnock Block, iron, steel, boilers, etc., have been appointed Chicago agents for the Falls Hollow Staybolt Co., Cuyahoga Falls, O., manufacturers of refined, charcoal bloom staybolts, both hollow and solid.

The Independent Pneumatic Tool Co., Chicago, Ill., reports that during the last two months it has received an unprecedented number of orders for Thor pneumatic tools. There has been a great demand for them by railroads, boiler shops, ship yards, foundries and bridge and iron works. The company is several months behind in its orders and has recently purchased considerable new machinery for its plant at Aurora.

The Independent Pneumatic Tool Co., First National Bank, Chicago, have just put out circular No. 5 devoted to Thor pneumatic tools. The tools are made in all sizes and are sent on trial. This company whose works are at Aurora, Ill., are also manufacturers of piston air drills, reversible reaming, tapping, wood boring and flue rolling machines; pneumatic riveting, chipping, calking and beading hammers; air motors, saws and air appliances of all kinds. The catalogue can be had for the asking.

The Marine Manufacturing & Supply Co., 158 South street, New York city, are moving their manufacturing department to New Brunswick, N. J. The new plant occupies the larger part of a city block and includes iron and brass foundry, machine shop, blacksmith and pattern shops, etc. They make steering wheels, windlasses, hoisting winches, crabs, derrick fittings and a complete line of ship builders' and contractors' supplies. They are in the market for new machinery and will be glad to receive manufacturers' catalogues.

"Artificial draft may be, and has been, produced by means of steam jets inducing a flow of air, by blowing engines, by air compressors, by positive rotary blowers and by fan blowers or exhausters. Although the practical success of the locomotive is largely due to Stephenson's introduction of the steam nozzle for draft production, it does not follow that the same method is applicable where the exhaust steam would not otherwise be wasted. The blowing engine, the air compressor and the rotary positive blast blower all possess disadvantages which render undesirable their adoption for this purpose. In fact, they have been introduced to only a very limited extent. The centrifugal fan has, however, been most extensively applied under all conceivable conditions, until it has become the symbol of artificial, or, as it may properly be designated, of mechanical draft, and is to-day the accepted substitute for the chimney."—[From Treatise on Mechanical Draft, published by the B. F. Sturtevant Co., Boston, Mass.]

A partnership, under the name of Frazier, Fox & Spencer, with offices at 718 Rockefeller building, Cleveland, O., has been formed for the purpose of acting as consulting engineers on designs, estimates, specifications, examinations, reports, etc., on bridges, steel frame buildings, light, heat, power and industrial plants, and also on warehouses, docks and terminals. The gentlemen composing the partnership are Mr. J. W. Frazier, associate member American Society of Civil Engineers; J. H. Fox, member American Society of Mechanical Engineers, and Mr. J. C. Spencer, member American Society Civil Engineers. Messrs. Frazier and Fox have been connected for about six years with the Brown Hoisting Machinery Co., of Cleveland, in the designing and contracting department. Mr. Spencer for several years was connected with the engineering and designing de-

partment of the American Bridge Co. For the past year he has been practicing as a consulting architectural engineer with offices in Cleveland.

That the mechanical stoker has reached such a state of perfection as to be considered indispensable in the equipment of modern boiler plants is indicated by the large number of orders booked by the Westinghouse Machine Co. for the Roney stoker, a type of their exclusive manufacture. During the past ten years this company has developed the Roney stoker by successive improvements until it has become capable of meeting successfully all the requirements of heavy modern service. During the past month orders have been received for no less than fifty-one Roney mechanical stokers, ranging in size from 54 in. by 20 grate to 132 in. by 26 grate, the largest of the orders being that of the Pennsylvania railroad for six 132 in. by 26 grate stokers and five 100 in. by 20 grate stokers. A large order from the Ohio Hospital for Epileptics at Gallipolis, O., has also been received, and others from the American Bridge Co., Ambridge, Pa.; National Tube Co., Pittsburg, Pa.; Detroit United Railway Co., Detroit, Mich.; York Engineering Co., York, Pa.; Proctor & Gamble Co., Cincinnati, O.; the Union Rolling Co., Cleveland, O.; Gulfport & Mississippi Coast Traction Co., Gulfport, Miss.; United Presbyterian Board of Publication, Pittsburg, Pa.; Indiana Boys School, Plainfield, Ind.; B. & O. office building at New York city, and the Railway Exchange building at Chicago, Ill.

PERSONAL

R. M. Parsons, formerly with Keer & Parsons, ship builders and engineers, Chicago, will open an office at 1136 Montana street, Chicago, for general drafting, designing and engineering. He will make marine work a specialty.

OBITUARY

Capt. Henry Merrick, formerly identified with the iron interests of the Marquette range, died at Cleveland last week.

Capt. David B. Cadotte died at Detroit on Saturday last from a paralytic stroke sustained aboard the ship Biwabac Sept. 19. He was born at Algonac, Mich., in 1851.

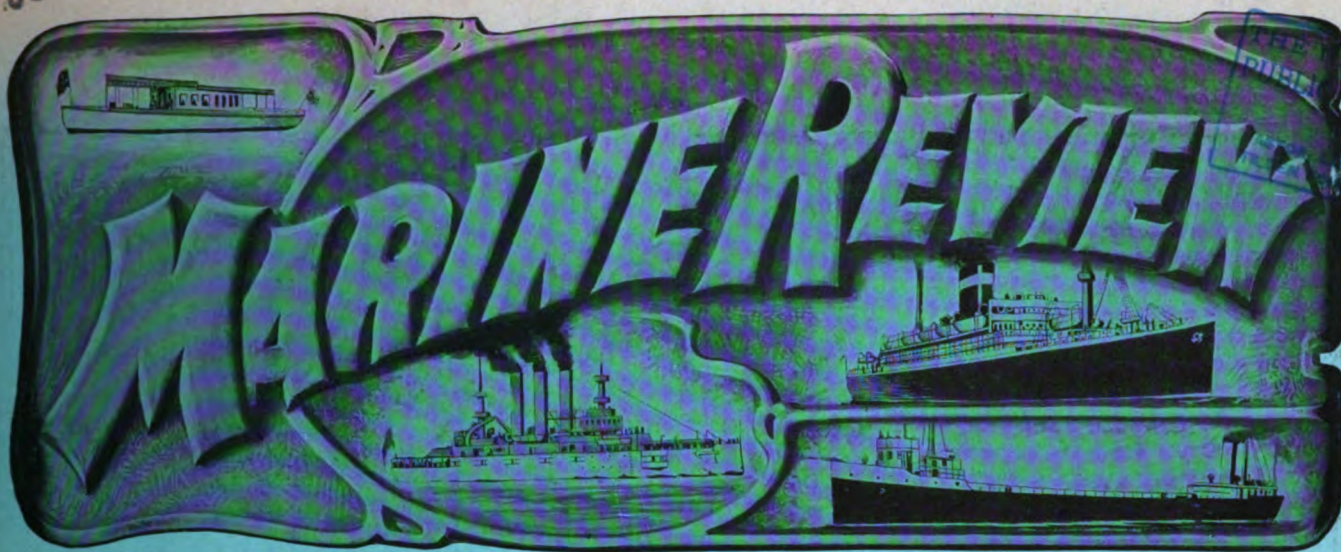
The Pusey & Jones Co., Wilmington, Del., has recently been awarded contracts for the construction of two steamers, one for the Isle of Pines Steamboat Co., to run between Cuba and the island of Huneas. The new vessel will be 138 ft. long, 28 ft. beam, and 8 ft. 4 in. deep. The other boat is for the Waldron Flexible Rotary Engine Co., and will be 63 ft. long, 7 ft. beam, and 4 ft. 4 in. deep.

The Merrill-Stevens Engineering Co., Jacksonville, Fla., will build a barge for R. Truffin & Co., Havana, Cuba. The barge will be 110 ft. long, 27 ft. beam and 8 ft. deep.

The battleship Mississippi is scheduled to be launched Sept. 30 at the yard of Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.

The Portsmouth navy yard will build an ocean-going naval tug 155 ft. 9 in. long and 32 ft. 6 in. beam.

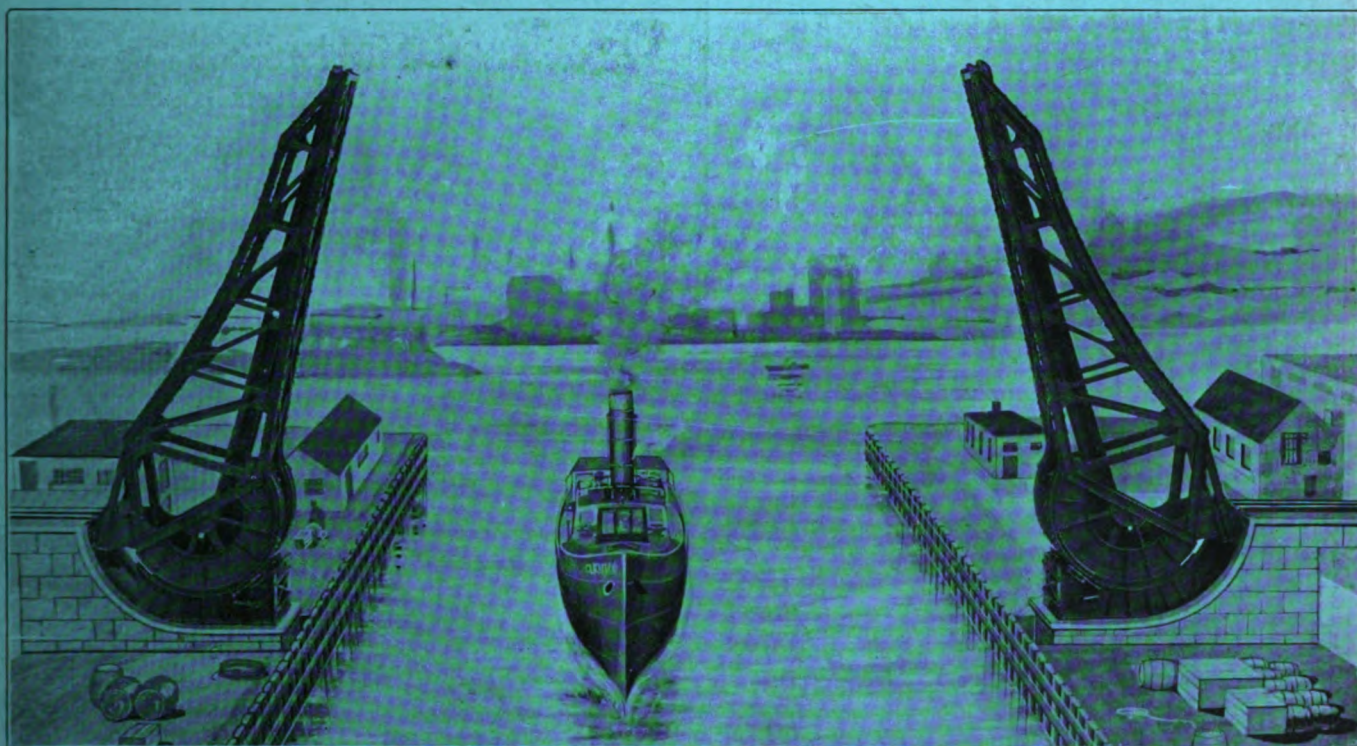
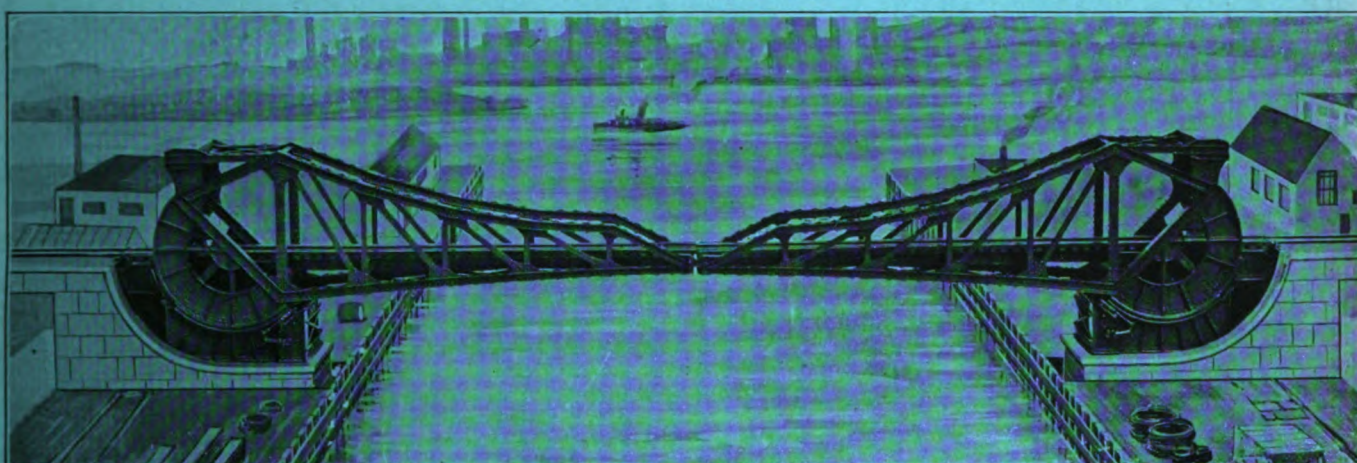
The marine railway of the Oxford Ship Building Co., Oxford, Md., was damaged by fire recently.



VOL. XXXII.

CLEVELAND, SEPTEMBER 28, 1905.

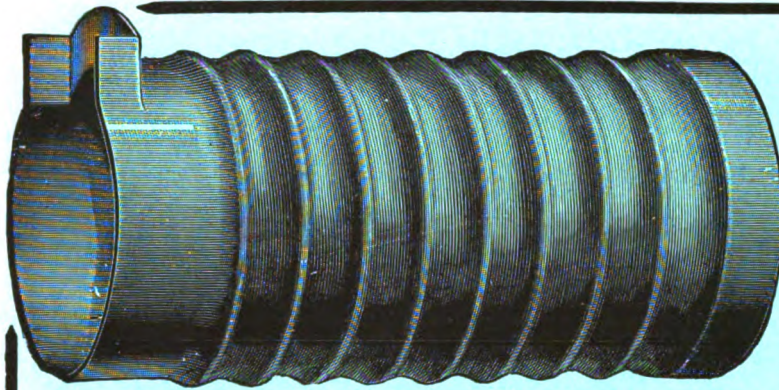
No. 13



THE COWING LIFT BRIDGE

Highest Award at St. Louis, 1904.

JOHN P. COWING, Contracting Engineer, 426 Citizens Bldg., CLEVELAND.



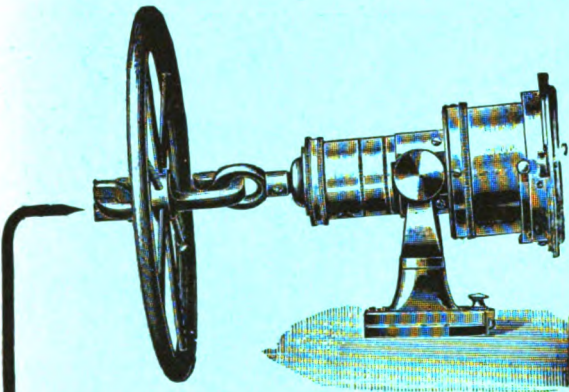
Morison Suspension Boiler Furnaces

For Land and Marine Boilers

Uniform Thickness—Easily Cleaned
UNEXCELLED FOR STRENGTH

Also Fox Corrugated Furnaces

Manufactured by **THE CONTINENTAL IRON WORKS,** West and Cayler Sts., NEW YORK.
Near 10th and 2nd Sts. Ferries
Borough of Brooklyn.



THE "NEPTUNE" LOG

The "Neptune" Ship Log has ball bearings for high speeds. We also make the "CHERUB" and "HARPOON" Ship Logs.

MAKERS TO THE BRITISH NAVY

THOMAS WALKER & SON

BIRMINGHAM, ENGLAND.

The Brown Hoisting Machinery Company, Incorporated.

Engineers, Designers and Manufacturers of Special Machinery for hoisting, conveying, storing and handling material of all kinds under the well known "BROWNHOIST" Patents.

Bridge Unloaders

for rapidly discharging bulk cargoes from vessels directly to cars to storage on docks.

Fast Plant Unloaders

for rapidly handling either bulk or package freight.

Cranes

of every description for every kind of service.

26 Cortlandt St.
NEW YORK CITY

MAIN OFFICE AND WORKS
CLEVELAND, O., U. S. A.

Carnegie Building
PITTSBURG, PA.

European Office, 39 Victoria St., LONDON, S. W.



Good for any Pressure

Write
For
Catalogue

KIELEY Standard Steam Trap

Made for Marine Work.

Also Reducing Valves, Steam Separators and expansion Traps for Marine Purpose.

SENT ON TRIAL

KIELEY & MUELLER

34 West Thirteenth St.

NEW YORK

SHIP MACHINERY, embodying the latest designs and many important patented improvements.

Sole builders of the Original and Only
**AUTOMATIC
STEAM TOWING MACHINE.**

Established
1857

AMERICAN SHIP WINDLASS CO.

Providence, R. I.

P. O. Box 53

We have completed our new Iron Foundry, and are prepared to execute orders for Castings, guaranteeing first-class work, prompt service and reasonable prices.

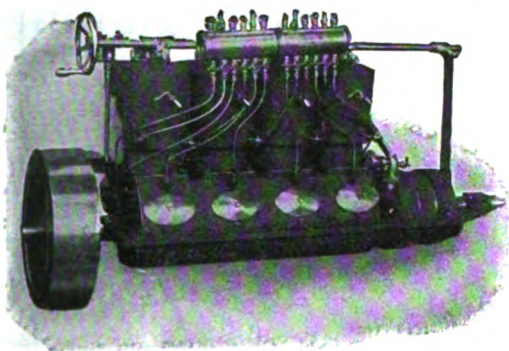
Send for illustrated catalogue

Address FRANK S. MANTON, President

MARINE IRON WORKS,
INCORPORATED
BUILDERS OF **MARINE ENGINES** AND **BOILERS**
HIGH PRESSURE COMPOUND
TRIPLE EXPANSION
PADDLE WHEEL.
COMPLETE OUTFITS OF
MARINE MACHINERY
A SPECIALTY.
STATION A. CHICAGO, ILL.
SUPPLEMENTARY CATALOGUE FREE ON REQUEST.

TRUSCOTT

THE DEPENDABLE MARINE MOTOR



Made to withstand the most severe and continuous service. A practical design characterized by the accessibility, compactness and simple ignition, gas producing and oiling features. Perfect control.

Four cycle type two and four cylinders, from 8 to 65 H.P. Smaller sizes of the two cycle type.

Catalogue and copy of The Launch for the asking.

Department 46.

Truscott Boat Mfg. Co.

ST. JOSEPH, MICHIGAN.

Why Some Export Campaigns Succeed

L. E. Marshall, of the Hall Safe Co., of New York, is one of the most successful export men in the country. He has chosen the reasons for the success and failure of different export campaigns as the text of an important article in the October 1 issue of

AMERICAN INDUSTRIES,

Official Organ of the National Association of Manufacturers.

This article is one of a great series of 12 papers on Export Trade which began with the September 1 issue of the paper. They will run for six months.

If you think you do not know all there is to know about selling goods abroad,

THIS
SPECIAL OFFER
IS FOR YOU.

Send 25 cents in stamps for a half year's subscription to AMERICAN INDUSTRIES.

Just half the regular subscription rate.

Other series of papers now running are

How to Advertise How to Systematize How to Insure

Twelve papers on each subject, forty-eight in all, every one by an expert, in addition to the regular contents of the paper.

25 cents in stamps gives you the whole series.

AMERICAN INDUSTRIES,

814 Broadway - Maiden Lane Bld., New York

OTIS STEEL

SHIP PLATES

FLANGE PLATES

TANK PLATES

STEEL CAR AXLES

FORGINGS OF ALL KINDS

"Otis" Fire Box Plates a Specialty.

STEEL CASTINGS FROM 100 TO 100,000 LBS.

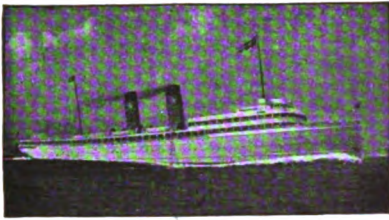
OTIS STEEL CO., Ltd., Head Office and Works, **CLEVELAND, O.**

New York: Thorpe, Platt & Co., 97 Cedar St.
Montreal: Homer Taylor, 183 St. James St.

AGENCIES.

Detroit: George W. House, Union Trust Building.

St. Louis: C. A. Thompson, 516 N. Third St.
San Francisco: John Woodlock, 154-156 First St.



The American Ship Building Company

MAIN OFFICE CLEVELAND, OHIO

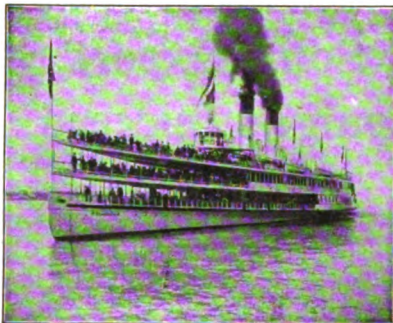
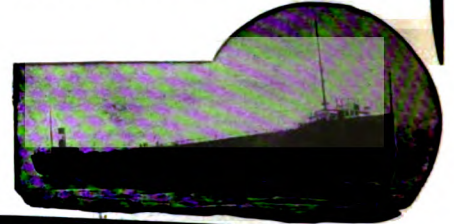
Marine and
Stationary Engines

STEEL SHIPS

Boilers and
Auxiliary Machinery

Sole Agents for the Lakes for the Ellis & Eaves Induced Draft System, as applied to boilers, giving increased power and great economy.

WORKS AT CLEVELAND AND LORAIN.



Detroit Ship Building Company

SHIP AND ENGINE BUILDERS

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM as applied to Boilers, giving increased power and great economy.

Steel Ship Yard located at Wyandotte, Michigan
Wooden Ship Yards and Dry Docks, Foot of Orleans Street, and Foot of Clark Ave., Detroit, Mich.

Alexander McVittie, President and Manager
William C. McMillan, Vice President
M. E. Farr, Secretary and Treasurer
Charles B. Calder, General Superintendent
Frank E. Kirby, Consulting Engineer

WM. L. BROWN, Pres.

R. C. WETMORE, Sec'y and Treas.

J. C. WALLACE, Vice-Pres.

C. W. FREY, Ass't. Treas.

ALFRED G. SMITH, Gen'l Supt.

Chicago Ship Building Company



STEEL SHIPS

Passenger or Freight

ANY SIZE

Yards, Dry Docks and Repair Shops at South Chicago, Ill.



The Superior Ship Building Company

SHIP AND ENGINE BUILDERS

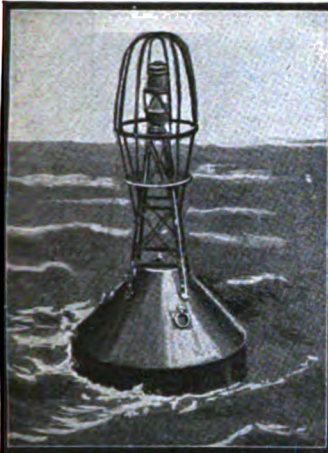
Dry Docks and Repairs of all kinds

Large stock of material always on hand for Repairing Wooden and Metal Ships.

Repairing promptly attended to, Night or Day.

WEST SUPERIOR

WISCONSIN



Pintsch Gas Lighted Buoys

BURN CONTINUOUSLY

FROM 80 TO 365 DAYS AND NIGHTS WITHOUT ATTENTION AND CAN BE SEEN AT A DISTANCE OF SIX MILES.

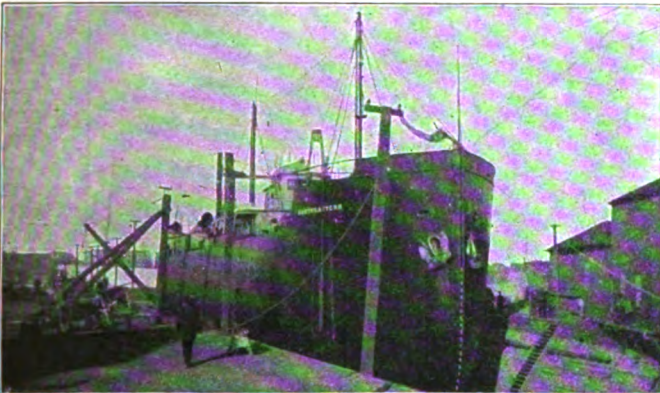
Brilliant & Steady Illumination. Economical & Reliable in Operation.

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1800 gas buoys and gas beacons in service.

Controlled by the

SAFETY CAR HEATING & LIGHTING COMPANY

160 Broadway, NEW YORK CITY.



Milwaukee Dry Dock Company

MILWAUKEE

WISCONSIN

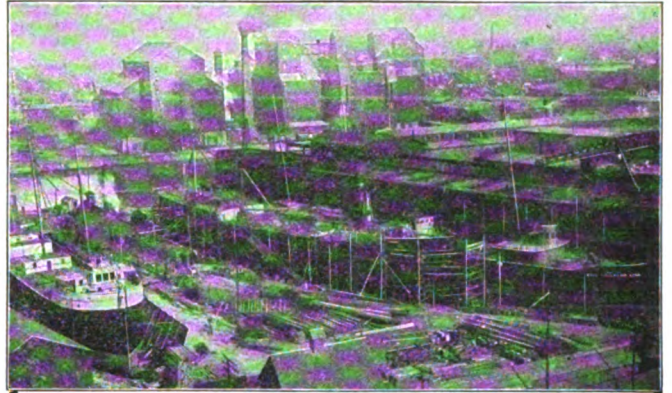
**SHIP REPAIRS
OF ALL KINDS**

We have two ship yards offering every facility for the repair of both steel and wooden vessels. South Yard Dock is 450 ft. long on keel blocks; 460 ft. over all; 60 ft. width of gate and 16 ft. over sill. West Yard Dock is 312 ft. on keel blocks; 45 ft. width of gate and 12 ft. over sill. Rudder pit in each dock.

Electric lights for night work.

**MAIN OFFICE AT SOUTH YARD
Foot of Washington Street**

Telephone Main 3



The Buffalo Dry Dock Company

BUFFALO

NEW YORK

Operating four Docks, Sixty-Ton Shear Legs, and in every way equipped with modern plant for the building and economical repairs of **STEEL AND WOODEN SHIPS.**

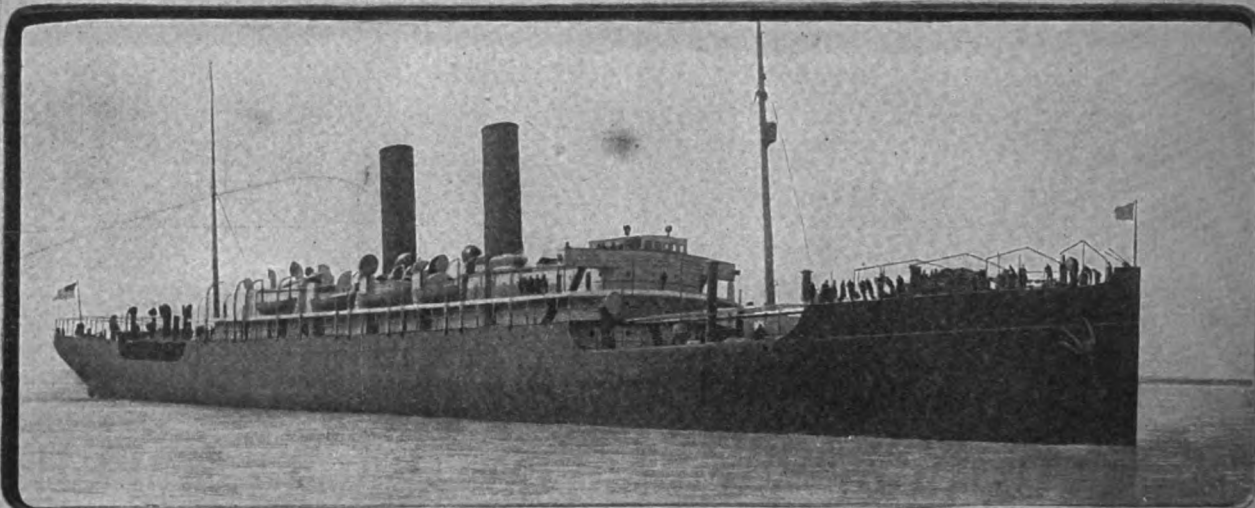
EDWARD SMITH, President ADAM STEEL, Superintendent
WILLIAM KNIGHT, Asst. Sec'y and Treas.

Office Telephone, 515 Seneca. President's Office Telephone, 2329 Seneca.
President's Residence Telephone, 209 Bryant. Asst. Sec'y's Telephone, 324 North.
Superintendent's Telephone, 2294 Howard.



OUR SHIPYARD

WITH ITS ACCOMPANYING DRY DOCKS
AND WORKS, WAS CAREFULLY DESIGNED,
EQUIPPED AND COMPLETED FOR THE



CONSTRUCTION AND REPAIRING
IN EVERY DETAIL OF

BATTLE SHIPS · ARMORED CRUISERS ·
PROTECTED CRUISERS · GUN BOATS ·
TORPEDO BOATS · TORPEDO BOAT
DESTROYERS · SUBMARINE BOATS ·
OCEAN LINERS · PASSENGER STEAM
ERS · FREIGHT CARRIERS · ETC · ETC ·

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.
1 BROADWAY NEW YORK — NEWPORT NEWS, VA.

New York Shipbuilding Company

Main office and works, Camden, N. J., New York office No. 1 Broadway

Builders of
SHIPS — ENGINES — BOILERS
HEAVY MACHINERY



Launch of "Mongolia," Pacific Mail S. S. Co., July 25, 1903.
615 feet long, 65 feet beam, 51 feet deep.

Best Facilities for Repair Work

**Pneumatic and Electric Tools;
ample wharfage accomodation.**

100 ton crane.

Repairs done under shelter.

CLYDE LINE APACHE

U.S. BATTLESHIP MAINE

**THE
WM.
CRAMP
& SONS
SHIP & ENGINE BUILDING Co.**

ESTABLISHED 1830

I.P. MORRIS COMPANY KENSINGTON SHIPYARD CO.
(ESTABLISHED 1829)

WARSHIPS AND MERCHANT STEAMERS
Pumping, Blowing and Hoisting Engines, Dry Docks
Vertical and Horizontal Turbines
Centrifugal Pumping Machinery
Marine Railway.
Repairs to all classes
of vessels

LARGE TURBINE

VIEW OF ONE OF OUR DRY DOCKS

Philadelphia

CLEAN BOILERS

Dearborn Water Treatment made to suit the case. Takes off the scale, keeps it off, stops corrosion and foaming. Send gallon of water for analysis.

DEARBORN DRUG & CHEMICAL WORKS
 WM H. EDGAR, PRES. ROBT. F. CARR, V. PRES. & GENL. MGR. C. M. EDDY, SECY & TREAS. WM B. MEVICKER, 2nd V. PRES. & EASTERN MGR.

G. R. CARR,
 Mgr. Marine Dept.

16 BRANCH OFFICES IN THE U. S.

227-234 Postal Telegraph Bldg., CHICAGO.

G

Lighter Rescue,
 SOO.

Lighter T. F. Newman,
 AMHERSTBURG.

Lighter Active,
 (McMyler remodeled, using
 clam shell bucket.)
 PORT HURON.

Lighter J. B. Noyes and
 Str. Saginaw,
 BUFFALO.



There ought to be a
U.S. AUTOMATIC INJECTOR

In Every Boiler Room.

It is the one perfect injector for every type of steam boiler. It is almost as indispensable for the perfect operation of a boiler as the water which it feeds.

It brings satisfaction to every engineer because it brings complete freedom from injector troubles. Its simple and strong construction insures freedom from repair bills, makes it easy to keep clean, and is the secret of its well-known reliability. The U. S. Automatic Injector starts at lower steam pressure and works to higher than any other; can be used as lifting or non-lifting injector, and its range and capacity are guaranteed by a certificate accompanying each. Demand the genuine "U. S." Take no substitute.

Some interesting facts about boilers and their care, with a few words about injectors, are contained in our famous "Engineer's Red Book." Sent free to all who write. Let us hear from you.

American Injector Company,
 Detroit, U. S. A.

PITTSBURG COAL COMPANY

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO

Steamboat Fueling Facilities at Various Points on the Great Lakes

CLEVELAND HARBOR { 4 Car Dumpers.
 3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper.
 1 Lighter.

ERIE HARBOR { 1 Car Dumper.
 Fuel Pockets.

ASHTABULA HARBOR { 1 Car Dumper.
 1 Lighter.

DETROIT RIVER BRANCH { Docks and Pockets at
 Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock and Pockets at Detour.
 Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

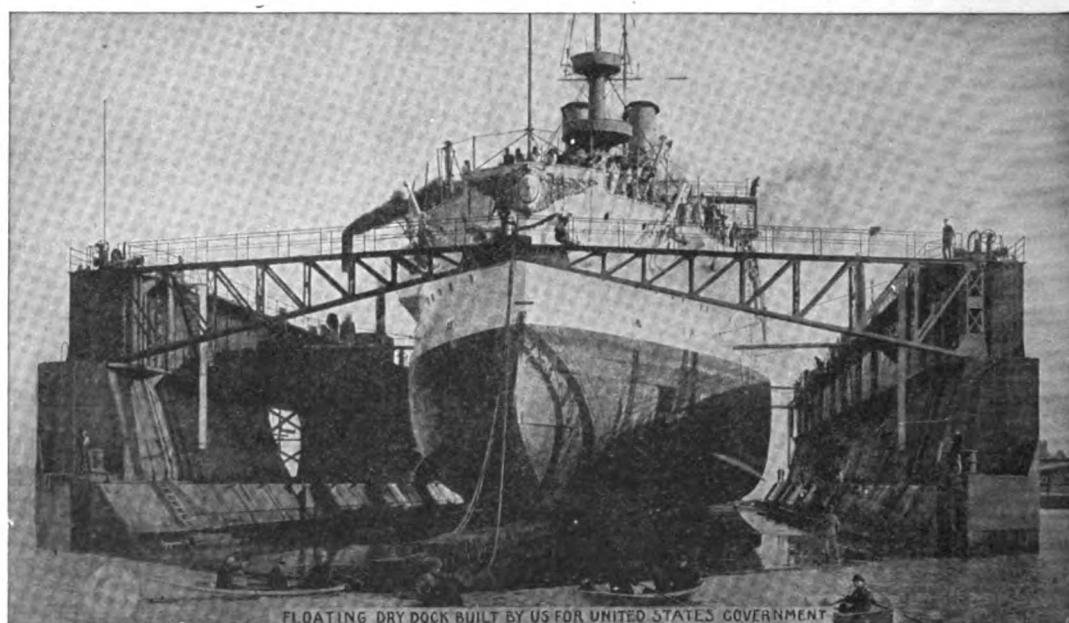
WE FURNISH ONLY THE BEST GRADE OF

PITTSBURG AND YOUGHIOGHENY COAL

MARYLAND STEEL COMPANY

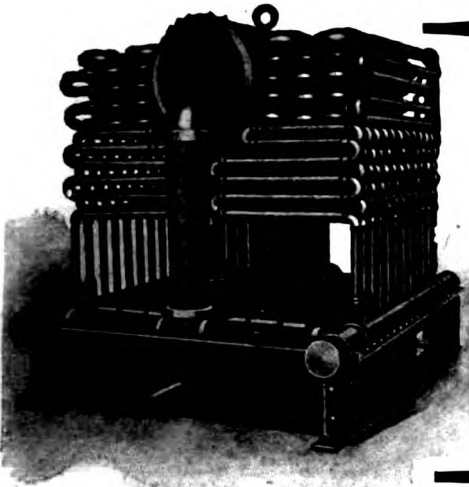
BUILDERS OF STEEL STEAMSHIPS,
TOW BOATS, SAILING VESSELS,
BARGES AND STEAM CRAFT
OF EVERY DESCRIPTION

STEEL FLOATING DRY DOCKS
CAPABLE OF DOCKING
THE LARGEST VESSELS



FLOATING DRY DOCK BUILT BY US FOR UNITED STATES GOVERNMENT

SPARROW'S POINT,
MARYLAND.



The Perfection of the Water Tube
System

DEARING BOILERS

GREATEST STEAM PRODUCERS
GREATEST FUEL ECONOMIZERS

Let us send you a catalogue

DEARING WATER TUBE BOILER CO.
DETROIT, MICH.

THE ROBERTS

SAFETY WATER-TUBE
BOILER CO.

Manufacturers of
High Grade

Marine Water Tube Boilers

Generators of the Highest Quality of Steam
NEARLY 1500 IN USE

Send for circulars
and stock sheet

MAIN OFFICE

39 Cortlandt St. New York City

Phone 599 Cortlandt

Works: Red Bank, N. J.
Phone, 49 Red Bank

Cable Address
"Bruniva"

LUNKENHEIMER WHISTLES

MADE IN GREAT VARIETY



PRODUCE THAT CLEAR HARMON-
IOUS, FAR-REACHING SOUND
HEARD EVERYWHERE.

GUARANTEED TO GIVE
PERFECT SATISFACTION.

IF YOUR LOCAL DEALER CANNOT FURNISH
THEM, NOTIFY US.

THE
LUNKENHEIMER
COMPANY

Largest Manufacturers of Engineering Specialties
in the World.

MAIN OFFICES
AND WORKS

Cincinnati, Ohio, U. S. A.

BRANCHES

NEW YORK—26 Cortlandt St.
LONDON—35 Great Dover St.

WE ALSO MANUFACTURE A COMPLETE LINE OF IRON & BRASS
VALVES, WATER COLUMNS, INJECTORS, OIL & GREASE CUPS,
LUBRICATORS, COCKS, ETC. 5 M. R.



GASOLINE MARINE ENGINES

Suitable for all Boats from 33 to 200 HP.
Over 100 in successful use.

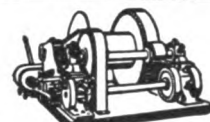
Also the well known and always
reliable Woolters Gas or Gasoline
Stationary Engines.



HOISTING ENGINES

Of all kinds and sizes, and
for all purposes, especially
for ship use.

Docking and Hauling Engines
and Wire Rope Windlasses.



AUTOMATIC TOWING MACHINES

Somewhat the cheapest, and
altogether the best. Positively
guaranteed.

Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

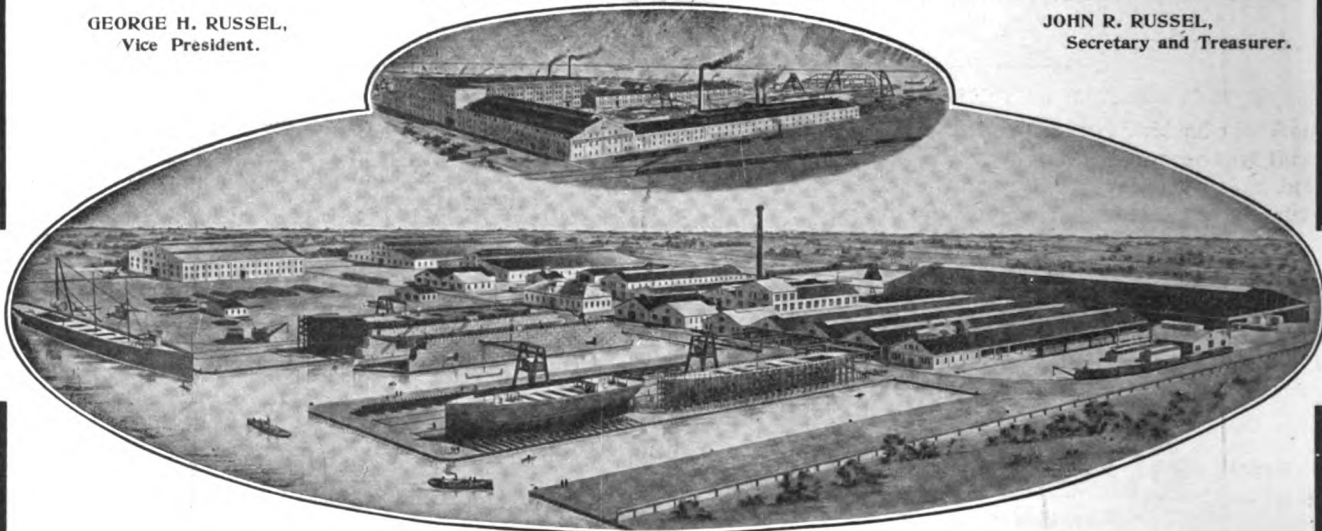
GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

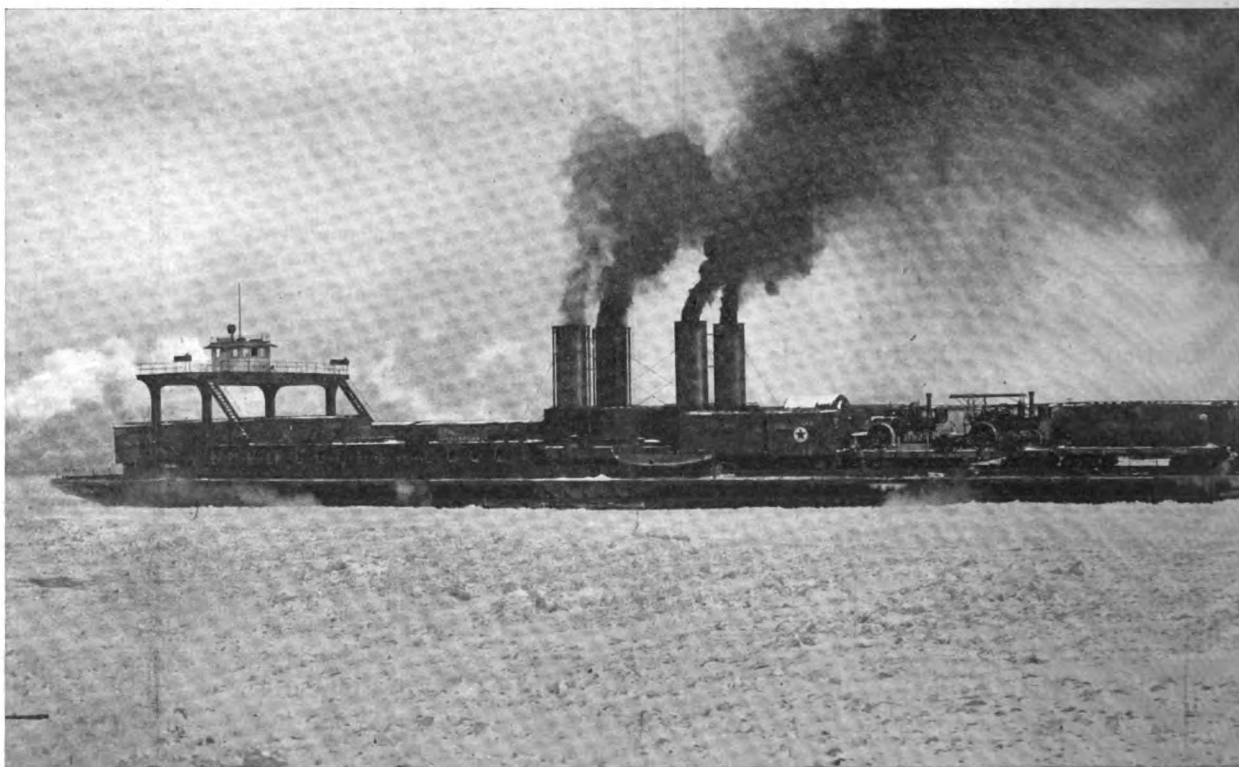
ANTONIO C. PESSANO, President and Gen. Mgr.

GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary and Treasurer.



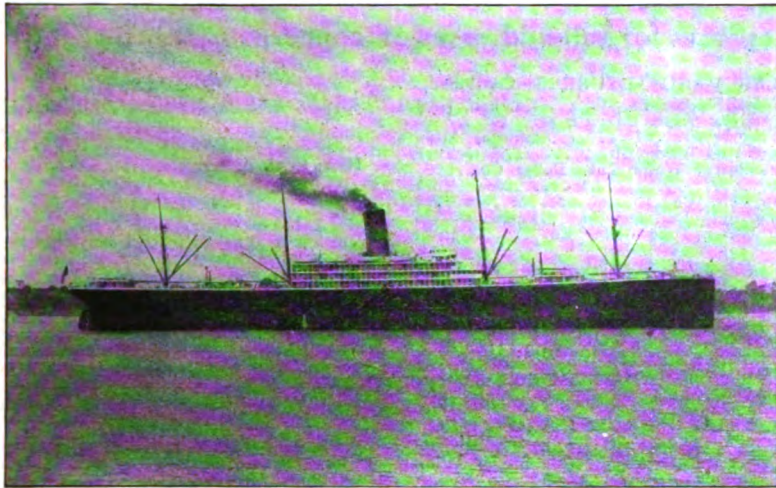
**Designers and Builders of
Steel Freight and Passenger Ships.
Marine Engines. = Hydraulic Dredges.**



MICHIGAN CENTRAL, CAR FERRY DETROIT CROSSING THE DETROIT RIVER IN THE ICE.

Marine Repairs a Specialty.

Hyde Windlasses and Capstans



Steamship Minnesota equipped with Hyde Windlass and Capstans.

Selected for the Minnesota and Dakota of the Great Northern Steamship Co.'s fleet—the largest vessels ever built in the United States. They are also being installed on nearly all of the vessels now building for the Navy Department, Revenue Cutter service, Lighthouse Board and the United States Coast Survey.

Reason—Their Superiority

Send for Illustrated Catalog.

HYDE WINDLASS COMPANY

BATH, MAINE

Geo. L. McCurdy

169 Jackson Boulevard

CHICAGO ILLINOIS

INSURANCE

HULLS and CARGOES

DIRECT REPRESENTATIVE OF LEADING
AMERICAN AND FOREIGN UNDERWRITERS

OUR WEEKLY STOCKLIST

Shows a complete line of Angles, Beams, Channels, Plates and Tees, for shipment on receipt of order.

Write for a copy.

**THE
BOURNE-FULLER CO.**

IRON STEEL

PIG IRON

COKE

Cleveland, Ohio.



ASHTON

**Cam Lever Pop Safety Valves
and Non-Corrosive
Steam Gauges.**

give highest efficiency and durability.
Specify them and get the best.

The Ashton Valve Co.

Boston

New York

Chicago

U. S. A.

Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug.New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.
Bowers, L. M. & Co.....Binghamton, N. Y.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons.....Philadelphia.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., Co.....Hyde Park, Mass.

ASH EJECTORS.
Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Jenkins, Russell & Eichelberger.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland

BAROMETERS, MARINE GLASSES, ETC.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELT CONVEYORS.
Link Belt Machinery Co.....Chicago.

BLOCKS, SHEAVES, ETC.
Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.
Power Specialty Co.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

BOAT BUILDERS.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. F. & Co. Winthrop Harbor, Ill.

BOILER CLEANING DEVICE.
Power Specialty Co.....Detroit.

BOILER COMPOUNDS.
Dearborn Drug & Chemical Works....Chicago.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co., Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Dearing Water Tube Boiler Co.....Detroit.
DeLauney, Belleville & Co., St. Denis, France.
Detroit Ship Building Co.....Detroit.
East End Boiler Works.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Works.....
.....Oswego, N. Y.
Marine Iron Works.....Chicago.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.

BOILER MANUFACTURERS—Continued.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co.....
.....Duluth, Minn.
Quintard Iron Works Co.....New York.
Roberts Safety Water Tube Boiler Co.....
.....New York.
Stirling, The Co.....New York.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.

BOILER RIVETS.
Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co., Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.

BRIDGES, BUILDERS OF.
Cowing, John P.....Cleveland.
Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.
.....Cleveland.
McMyler Mfg. Co.....Cleveland.

BULKHEAD DOORS, WATERTIGHT.
"Long Arm" System Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CANVAS SPECIALTIES.
Baker & Co., H. H.....Buffalo.
Bunker, E. A.....New York.
Upson-Walton Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co., Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.
Woodhouse Chain Works.....Trenton, N. J.

CHAIN CONVEYORS, HOISTS.
Brown Hoisting Machinery Co. (Inc.)....
.....Cleveland.
General Electric Co.....Schenectady, N. Y.

CHAIN HOISTS.
Boston & Lockport Block Co.....Boston, Mass.

CHARTS.
Penton Publishing Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.
Brown Hoisting Machinery Co. (Inc.)....
.....Cleveland.
Link Belt Machinery Co.....Chicago.
McMyler Mfg. Co.....Cleveland.

COMPASSES.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS CORRECTORS.
How, Benj. V.....Boston.

CONDENSERS.
Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E., Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.
Breyman & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich.
Lake Superior Contracting & Dredging Co.
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H., Milwaukee.
Sullivan, M.....Detroit.

CORDAGE.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.
Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

CRANES, TRAVELING.
Brown Hoisting Machinery Co.....Cleveland.
McMyler Mfg. Co.....Cleveland.

DIVING APPARATUS.
Morse, A. J. & Son.....Boston.
Schrader's Son, Inc., A.....New York.

DRAFT, MECHANICAL.
Sturtevant Co., B. F.....Hyde Park, Mass.

DREDGING CONTRACTORS.
Breyman & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Great Lakes Dredge & Dock Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Hubbell Co., H. W.....Saginaw, Mich.
Lake Superior Contracting & Dredging Co.
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H., Milwaukee.
Sullivan, M.....Detroit.

DREDGING MACHINERY.
Quintard Iron Works Co.....New York.

DRYING APPARATUS.
Sturtevant, B. F. Co.....Hyde Park, Mass.

DRY DOCKS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Tietjen & Lang Dry Dock Co.....Hoboken, N. J.

DREDGE BUILDERS.
Manitowoc Dry Dock Co.....Manitowoc, Wis.

DYNAMOS.
General Electric Co.....Schenectady, N. Y.
Mietz, Aug.....New York.
Sturtevant, B. F. & Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.

ECONOMIZERS, FUEL.
Sturtevant Co., B. F.....Hyde Park, Mass.

ELECTRIC HOISTS AND CRANES.
General Electric Co.....Schenectady, N. Y.

WANTED and FOR SALE Department.

PROPOSALS.

U. S. ENGINEER OFFICE, 57 Park St., Grand Rapids, Mich., Sept. 4, 1905. Sealed proposals for extension of Piers at Holland (Black Lake), Mich., will be received here until 3 p. m., October 4, 1905, and then publicly opened. Information furnished on application. M. B. ADAMS, Col. Engrs. Sept. 28

U. S. ENGINEER OFFICE, 57 Park St., Grand Rapids, Mich., Sept. 11, 1905. Sealed proposals for construction and repair of piers at Muskegon, Mich., will be received here until 3 p. m., Oct. 11, 1905, and then publicly opened. Information furnished on application. M. B. ADAMS, Col. Engrs. Oct. 5.

FOR SALE.

Marine Engine.

FOR SALE.—One fore and aft compound marine engine. Size 27 and 50 by 40. Address MONTAGUE IRON WORKS, Montague, Mich.

Tug for Sale.

Tug Kate for sale cheap at one-third of her actual cost. Sixty-three ft. keel, 16 ft. beam, 7 ft. draught. Engine 16 x 18; 41 boiler. Easy on fuel. Has winch for hauling in tow line and closing rafts. Full equipment. Just laid up. Snap for some one. JOSEPH GANLEY, Agent, Sault Ste. Marie, Mich.

FOR SALE.

FOR SALE.

GASOLINE DELIVERY BOAT "I-NO-U."

Hull 38½ ft. long and 8½ ft. beam. Built very heavy and in the best manner possible. Keel 5¼ in. x 10½ in. Frames 2 in. x 3 in. at bottom and 2 in x 2 in. at top.

Planked and ceiled with 1½ in oak. Lacy Bros. 15-H. P. engine. Throws a 34 in. two-bladed reversible wheel 300 revolutions per minute and runs 8½ miles per hour. Nicely modeled boat and handles well. This is her second season and she is nearly as good as new. Lowest cash price \$1,800. Photo on application, but she should be seen to be appreciated.

THE HARDY & DISCHINGER CO.

Oils and Supplies,

TOLEDO, - OHIO.

For Sale.

Charter or trade for larger boat after Aug. 25, the freight and passenger Str. Hazel. Length 90 ft., beam 18 ft. Inquire of R. B. RICE, Grand Haven, Mich. 8-31

FOR SALE.

FOR SALE \$3500.00.

The Steamer Gordon Campbell.

Burned on spar-deck, forward only—easy to cut down to lumber barge, to carry million feet, or rebuild for package freight. Machinery, boilers and hull untouched and in good condition. Boat in dry dock and thoroughly overhauled last summer. Can be seen in Chicago. Address Room 613, 59 Dearborn St., Chicago. t f

WANTED.

WANTED—Competent man in boiler works who understands construction and can figure cost. Big opportunity for right man. Address "Michigan," care Marine Review, Cleveland.

WANTED TO PURCHASE.—Good steel or wooden vessel of Welland canal size. Must be in good condition and have sufficient power to enable her to tow one vessel carrying fifteen hundred tons. Address Box 84, MARINE REVIEW, Cleveland.

Time and Distance Tables for Lake Ships

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time saver to the vessel owner or vessel agent as well as captain or engineer. Send for it on approval.

Price \$1.00

MARINE REVIEW,

Cleveland, Ohio



Makers of only the Highest Quality of Staybolt Material, in Hollow and Solid Bars, from the Best Double-Refined Charcoal Iron or Steel. **FALLS HOLLOW STAYBOLT IRON** is the only Reliable Flexible Staybolt in the World.

The Only Staybolt Iron which responds in service to the expansion and contraction of fire box; which relieves the material in molecular strains; which is self protective from burning; which does not make the side sheets crack; which earns its own cost in oxygen through it to the fire; always sure in giving warning of breakage.

The Staybolt which lasts longest, requires least repairs, gives longest life to the fire box, and the longest service in the engine on the rails. In use by Leading Railways of the United States, Canada, Mexico, Japan and Norway. Also by Marine Engineers and the United States Government. And by the Manufacturers of Mining Drills and by others requiring absolutely reliable material.

THE STANLEY B. SMITH COAL AND DOCK CO., TOLEDO HARBOR, TOLEDO, OHIO.

1,800 Feet of Dock.

6 McMyler Derricks.

Capacity 3,000 Tons Daily.

Fuel Lighters.—"KANAWHA."
—"PENNSYLVANIA."
—"HOCKING."

Docks.—PENNSYLVANIA R. R.
—"HOCKING VALLEY R. R."
—"TOLEDO AND OHIO CENTRAL R. R."

SMITH'S COAL DOCK, Detroit River, DETROIT, MICH.

12 Pockets.

Platform.

Low Dock.

Operated by STANLEY B. SMITH & CO.

MARINE SUPPLY COMPANY—STORE AND ICE HOUSE ON DOCK.

Buyers' Directory of the Marine Trade.—Continued.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.
Mietz, Aug.New York.
Sturtevant, B. F. & Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros.....Philadelphia.
Lockwood Mfg. Co.....East Boston, Mass.
Marine Iron Works.....Chicago.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug.New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co.....Duluth, Mich.
Quintard Iron Works Co.....New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.

ENGINE BUILDERS, STEAM.

Sturtevant Co., B. F.....Hyde Park, Mass.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

ENGINE TESTING.

Parsons, Ralph M.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James.....Cleveland.
Roelker, H. B.....New York.
Wood, W. J.....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.

Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.

FIRE EXTINGUISHERS.

Safety Fire Extinguisher Co.....New York.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.

FORGES.

Sturtevant, B. F. Co.....Boston.
Sutton Co., C. E.....Toledo, O.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B. Toledo, O.

FUELING PLANTS, BUILDERS OF

Link Belt Machinery Co.....Chicago.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

GAUGES, WATER.

Bonner Co., Wm. T.....Boston.
Lunkenheimer Co.....Cincinnati, O.

GENERATING SETS.

Sturtevant Co., B. F.....Hyde Park, Mass.
General Electric Co.....Schenectady, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GREASE EXTRACTORS.

Greacen-Derby Engineering Co.....
.....Perth Amboy, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.
Sutton Co., C. E.....Toledo, O.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.).....Cleveland.
Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
McMyler Mfg. Co.....Cleveland.
Marine Iron Co.....Bay City.
Mietz, Aug.New York.

HOLLOW SHAFTINGS, IRON OR STEEL.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros.....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F.....New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.

IRON CASTINGS.

Sutton Co., C. E.....Toledo, O.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Gaynor, T. F.....New York.
Kahnweiler's Sons, D.....New York.
National Cork Co.....Brooklyn.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

LOGS.

Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.
Rayner, J.....Chicago.

MACHINISTS.

Chase Machine Co.....Cleveland.
Hickler Bros.....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James.....Cleveland.
Wood, W. J.....Chicago.

OAKUM.

Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug.New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.

Crane Co.....Chicago.
Jenkins Bros.....New York.
Katzenstein, L. & Co.....New York.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AZIMUTH TABLES BETWEEN PARALLELS OF LATITUDE 30° AND 60° INCLUSIVE—Burdwood.....	2 00	NAVAL ARCHITECTURE—W. J. Lovett. Practical, Laying-Off, Theoretical. (Just out, 1905.).....	2 50
AZIMUTH TABLES FOR PARALLELS OF LATITUDE BETWEEN 40° N. AND 50° N. INCLUSIVE—Hydrographic office.....	50	NAVAL CONSTRUCTOR—By Geo. Simpson. A book on Ship Design for Students, Ship Builders and Owners, Marine Superintendents, Engineers and Draughtsmen.....	5 00
AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. 1908 edition.....	\$2 25	NAVAL DICTIONARY—Howard Patterson.....	1 00
CLASS BOOK OF NAVAL ARCHITECTURE—Practical—Laying Off—Theoretical—By W. J. Lovett.....	2 50	NAVIGATION SIMPLIFIED—C. E. McArthur. Containing all problems required for U. S. Local Inspector's Examination of Masters and Mates of seagoing vessels.....	1 00
COURSE CORRECTOR—A great aid to those who use true and magnetic courses, and apply deviation, etc.—Capt. R. M. Pugsley.....	50	OCEAN NAVIGATION AND NAUTICAL TABLES—Int. Textbook Co.	3 50
COURSE PROTRACTOR—Capt. R. M. Pugsley.....	1 00	PILOT AND HOW TO DO THE WORK—A small pocket guide to the U. S. Local Inspectors examination of masters and mates of ocean-going steam and sailing ships.....	1 00
CURRENT-COURSE PROTRACTOR—Use this instrument and know exactly how much to allow for a current—Capt. R. M. Pugsley.....	3 00	POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery.....	8 00
DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8¼ in. by 5 in., cloth.....	1 50	PRACTICAL COMPASS ADJUSTMENT on Iron, Composite and Wooden Vessels. Illustrated.—Capt. W. J. Smith.....	2 00
ELECTROMAGNETIC PHENOMENA AND THE DEVIATIONS OF THE COMPASS—Com. T. A. Lyons.....	6 00	PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron Ships—J. T. Towson.....	2 00
ELEMENTARY NAVAL TACTICS—Bainbridge-Hoff.....	2 00	PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship. Wreck Lifting, Avoiding Collision, Wire Splicing, Displacement and everything necessary to be known by seamen of the present day. Second edition, illustrated.—John Todd and W. B. Whall.....	8 40
ELEMENTARY SEAMANSHIP—By Barker. New and enlarged edition.....	2 50	PRACTICAL SHIPBUILDING: A treatise on the structural design and building of modern steel vessels—By A. Campbell Holms—Two volumes.....	16 00
ELEMENTS OF NAVIGATION—Henderson.....	1 00	RESISTANCE AND PROPULSION OF SHIPS—Durand.....	6 00
ELEMENTS OF YACHT DESIGN—Norman L. Skene.....	2 00	SAILING DIRECTIONS FOR THE GREAT LAKES—Hydrographic Office—Separate book for each lake—50 cents each or full set for.....	2 00
GUIDE to the U. S. Local Inspectors examination of masters and mates of ocean-going steam and sailing ships, with complete instructions and information for those who wish to learn navigation and save the expense of attending school by preparing themselves for the examination—Capt. R. M. Pugsley.....	2 00	SAILS AND SAILMAKING.....	1 25
HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes.....	2 75	SCOTT'S COAST PILOT—Geo. Scott.....	1 50
HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg.....	1 75	SCREW PROPELLER COMPUTER—McDermott.....	5 00
HOW TO BUILD A LAUNCH FROM PLANS—, with general instructions for the care and running of gas engines. Chas. G. Davis.....	1 50	SCREW PROPELLERS AND MARINE PROPULSION—I. McKim Chase.....	3 00
ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson.....	2 00	SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION—Earl of Dunraven. Two volumes.....	7 00
INDICATOR PRACTICE—Hemenway.....	2 00	SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean-going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound.....	2 00
INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New edition.....	2 00	SHIP BUILDING—Tables for constructing ship's lines. Second edition. Archibald Hogg.....	2 00
KNOW YOUR OWN SHIP—Thos. Walton.....	2 50	SIMPLE ELEMENTS OF NAVIGATION—Young. New second edition.....	2 00
LAKE AND COAST NAVIGATION AND NAUTICAL ASTRONOMY—Int. Textbook Co.....	3 50	SMALL YACHT CONSTRUCTION AND RIGGING—Linton Hope.....	2 00
MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises.....	1 50	STABILITY OF SHIPS—Sir E. J. Reed.....	2 40
MARINE INSURANCE—W. Goe.....	1 50	STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship superintendents, students and marine engineers—Thos. Walton.....	5 50
MARINE PROPELLERS—Barnaby.....	4 50	TAIT'S SEAMANSHIP—Jas. Tait.....	75
MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently—J. W. Dixon.....	1 00	TEXT BOOK OF NAVAL ARCHITECTURE—J. J. Welch.....	1 50
MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations.....	1 25	TEXT BOOK OF SEAMANSHIP—Com. S. B. Luce. U. S. N. Equipping and handling of vessels under sail or steam.....	10 00
MODERN NAVIGATION: A text book of navigation and nautical astronomy suitable for the examinations of the royal navy and board of education—Wm. A. Hall.....	4 00	THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design—Samuel J. P. Thearle. In two volumes.....	2 50
MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. Two volumes. Second edition, revised and enlarged.....	5 25	THEORETICAL NAVAL ARCHITECTURE—E. L. Attwood. Text book; 114 diagrams.....	2 50
MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy.....	6 00	WAR SHIPS: A TEXTBOOK ON THE CONSTRUCTION, PROTECTION, STABILITY, TURNING, ETC., OF WAR VESSELS—E. L. Attwood.....	3 00
NAVAL ARCHITECTS AND SHIPBUILDERS' POCKET BOOK—Clement Mackrow. Formulae, rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged.....	5 00	"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky.....	2 40
NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels—Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards.....	5 00	YACHT ETIQUETTE—Capt. Howard Patterson.....	1 00
NAVAL ARCHITECTURE—Cecil H. Peabody. Just published.....	7 50		
NAVAL ARCHITECTURE—Sir W. H. White. New edition. 750 pages.....	9 00		

Sent to any address, carriage prepaid, at prices named. There is no book on Navigation, Marine Engineering, Ship Building, or the allied industries, that is not either published or for sale by

THE MARINE REVIEW,
CLEVELAND, O.

Buyers' Directory of the Marine Trade.—Continued.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
 Dunbar & Sullivan Dredging Co.....Buffalo.
 Fitz-Simons & Connell Co.....Chicago.
 Great Lakes Dredge & Dock Co.....Chicago.
 Hickler Bros.....Sault Ste. Marie, Mich.
 Hubbell Co., H. W.....Saginaw, Mich.
 Lake Superior Contracting & Dredging Co.....Duluth, Minn.
 Parker Bros. Co., Ltd.....Detroit.
 Smith Co., L. P. & J. A.....Cleveland.
 Starke Dredge & Dock Co., C. H.....Milwaukee.
 Sullivan, M.....Detroit.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
 Crane Co.....Chicago.
 Macbeth Iron Co.....Cleveland.
 Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller.....New York.
 Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Cramp, Wm. & Sons.....Philadelphia.
 Detroit Ship Building Co.....Detroit.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Lockwood Mfg. Co.....East Boston, Mass.
 Marine Iron Works.....Chicago.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Roelker, H. B.....New York.
 Sheriffs Mfg. Co.....Milwaukee.
 Superior Ship Building Co.....Superior, Wis.
 Thropp & Sons Co., J. E.....Trenton, N. J.
 Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Great Lakes Engineering Works.....Detroit.
 Marine Iron Works.....Chicago.
 Kingsford Foundry & Machine Works.....Oswego, N. Y.

PUNCHES AND SHEARS.

Sutton Co., C. E.....Toledo, O.

RANGES.

Stamford Foundry Co.....Stamford, Conn.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
 Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.

Ashton Valve Co.....Boston.
 Crane Co.....Chicago.
 Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

SHAFTING, HOLLOW.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

SHEARS.

See Punches, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Buffalo Dry Dock Co.....Buffalo.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Ship Building Co.....Detroit.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Lockwood Mfg. Co.....East Boston, Mass.
 Manitowoc Dry Dock Co.....Manitowoc, Wis.
 Maryland Steel Co.....Sparrows Point, Md.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 New York Shipbuilding Co.....Camden, N. J.
 Roach's Ship Yard.....Chester, Pa.
 Shipowner's Dry Dock Co.....Chicago.
 Smith & Son, Abram.....Algonac, Mich.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
 Marine Mfg. & Supply Co.....New York.
 Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, Joseph.....Duluth.
 Steel, Nacey & Hynd.....Cleveland.
 Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.

Russell & Watson.....Buffalo.

SHIPMATE RANGES.

Stamford Foundry Co.....Stamford, Conn.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.
 Rayner, J.....Chicago.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.....Cleveland.
 Holmes, Samuel.....New York.
 Lester, S. S.....Quebec, Can.
 McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
 Anchor Line.....Buffalo.
 Boston Steamship Co.....Boston.
 Cleveland & Buffalo Transit Co.....Cleveland.
 International Mercantile Marine Co.....Philadelphia.
 Mallory Line.....New York.
 Merchants' Montreal Line.....Montreal.
 New York & Cuba Mail S. S. Co.....New York.
 Red Star Line.....New York.
 United Fruit Co.....Boston.

STEEL CASTINGS.

Otis Steel Co.....Cleveland.
 Sutton Co., C. E.....Toledo, O.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
 Chase Machine Co.....Cleveland.
 Detroit Ship Building Co.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Marine Mfg. & Supply Co.....New York.
 Moulton Steering Engine Co.....New York.
 Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
 Schrader's Son, Inc., A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward.....Buffalo.
 Hynd, Alexander.....Cleveland.
 Parker Bros. Co., Ltd.....Detroit.
 Nacey, James.....Cleveland.
 Steel, Adam.....Cleveland.
 Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
 Lunkenheimer Co.....Cincinnati, O.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
 Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.
 Great Lakes Towing Co.....Cleveland.

TRAPS, STEAM.

Kieley & Mueller.....New York.
 Sturtevant Co., B. F.....Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

Ashton Valve Co.....Boston.
 Crane Co.....Chicago.
 Jenkins Bros.....New York.
 Kieley & Mueller.....New York.
 Lunkenheimer Co.....Cincinnati.
 Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Lunkenheimer Co.....Cincinnati.
 Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co.....Detroit.
 Detroit White Lead Works.....Detroit.
 Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co.....Hyde Park, Mass.
 Sutton Co., C. E.....Toledo, O.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
 Brown & Co.....Buffalo.
 Elphicke, C. W. & Co.....Chicago.
 Fleming & Co., E. J.....Chicago.
 Gilchrist & Co., C. P.....Cleveland.
 Hall, John B.....Buffalo.
 Helm & Co., D. T.....Duluth.
 Hawgood & Co., W. A.....Cleveland.
 Holmes, Samuel.....New York.
 Hutchinson & Co.....Cleveland.
 Lester, S. S.....Quebec, Can.
 McCarthy, T. R.....Montreal.
 Mitchell & Co.....Cleveland.
 Parker Bros. Co., Ltd.....Detroit.
 Prindiville & Co.....Chicago.
 Richardson, W. C.....Cleveland.
 Sullivan, D. & Co.....Chicago.

WATER GAUGES.

Bonner Co., Wm. T.....Boston.
 Lunkenheimer Co.....Cincinnati, O.

WATERTIGHT BULKHEAD DOORS.

"Long Arm" System Co.....Cleveland.

WHISTLES, STEAM.

Ashton Valve Co.....Boston.
 Lunkenheimer Co.....Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
 DeGrauw, Aymar & Co.....New York.
 Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
 American Ship Building Co.....Cleveland.
 Hyde Windlass Co.....Bath, Me.
 Marine Mfg. & Supply Co.....New York.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
 Georgian Bay Engineering Works.....Midland, Ont.
 Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WOODS, FOREIGN.

Rayner, J.....Chicago.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.
 Great Lakes Towing Co.....Cleveland.
 Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
 Manitowoc Dry Dock Co.....Manitowoc, Wis.
 Truscott Boat Mfg. Co.....St. Joseph, Mich.

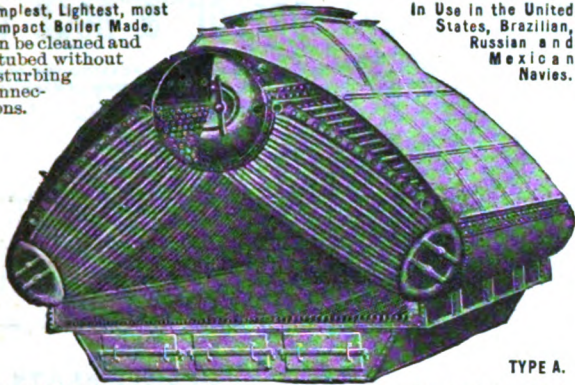
YAWLS.

Drein, Thos. & Son.....Wilmington, Del.

THE MOSHER PATENT WATER TUBE BOILER

Simplest, Lightest, most Compact Boiler Made. can be cleaned and retubed without disturbing connections.

In Use in the United States, Brazilian, Russian and Mexican Navies.



TYPE A.

As many as forty tubes can be cleaned or renewed through a single hand-hole; has greater steam and water capacity than any other water tube boiler. Send for descriptive catalogue.

MOSHER WATER TUBE BOILER CO., NO. 1 BROADWAY, N. Y.

Detroit Scotch Water Tube Boiler

Internally Fired.

Scotch and Water Tube types combined, eliminating all objections.

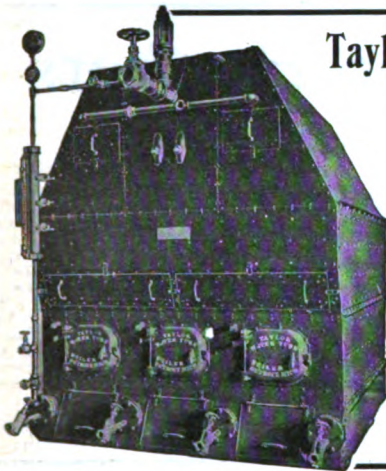
Half the weight of ordinary Scotch boilers.

Standard corrugated furnaces.

Patent applied for.

Investigate before buying any other.

EAST END BOILER WORKS
Detroit, Mich.

**Taylor Water Tube Boiler Co.**

Vertical Tubes, sectional, large steam space and liberating area.

Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine. Free circulation type.

Send for full description.

322 Franklin St.
DETROIT, MICH.

250 STEAM VESSELS

Now Equipped With

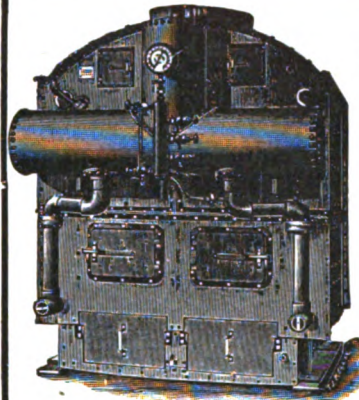
ALMY'S PATENT

SECTIONAL
Water Tube Boilers

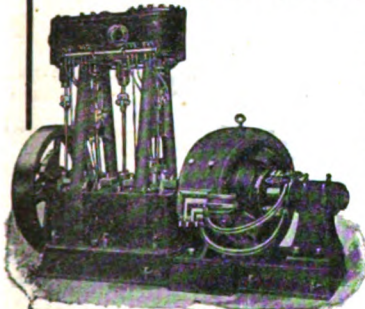
Bear Evidence of Their
Excellent Qualities

Almy Water-Tube Boiler Co.

PROVIDENCE, R. I.



We offer an
Engine for Direct-Connected Electric Plants



which we can guarantee

to stand up under extreme changes from no load to full load, and to REGULATE TO PERFECTION.

That its construction is strong is self-evident.

The shaft, rods, valve stems and other working parts are made of forged steel.

Every bearing is automatically lubricated.

In finish it is all that can be desired.

Write for full particulars and tests.

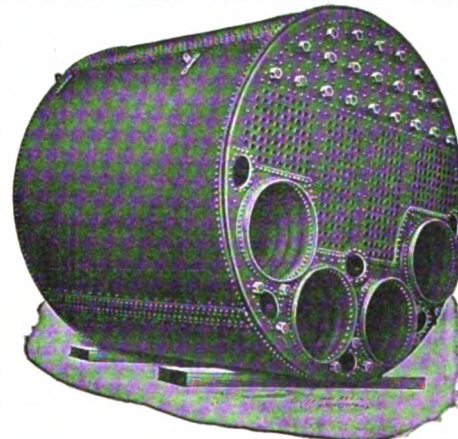
John E. Thropp & Sons' Co.
TRENTON, N. J.

MARINE BOILERS

OF ALL TYPES

KINGSFORD FOUNDRY & MACHINE WORKS,

Oswego, N. Y.

**LATEST PATENT ANCHOR****THE NATIONAL**

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,
Binghamton, N. Y.

Catalogue on Application.

The National and International

ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.

**Northwestern Steam Boiler & Mfg. Co.**

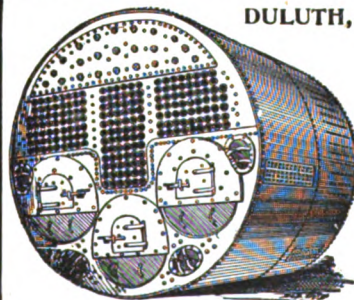
DULUTH, MINN.

Manufacturers of

BOILERS, ENGINES AND MACHINERY

Special facilities for Marine Work. Repairs promptly attended to Night or Day.

We carry a complete line of Marine and Engineers' Supplies.



TELEPHONES: OFFICE AND WORKS, 615.

RESIDENCE CALLS: M. A. FVAN, Pres. and Gen'l Mgr., 776-R; J. H. OPPERMAN, Secretary, 579-R; E. KRIZ, Superintendent, 557-M.

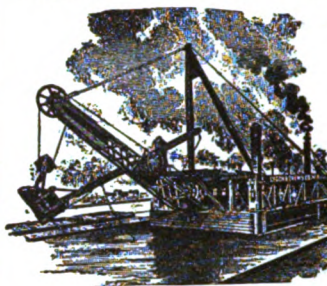
G. H. Breymann & Bro's

CONTRACTORS FOR PUBLIC WORKS

Dredging, Dock Building, Etc.

5, 6 AND 7 MARINE BUILDING
TOLEDO, OHIO.

GREAT LAKES DREDGE & DOCK CO.



OWNS AND OPERATES THE PLANTS
OF THE FORMER COMPANIES:

Lydon & Drews Co.
Hausler & Lutz Co.
Green's Dredging Co.
Chicago Star Con. & D. Co.
McMahon & Montgomery Co.
Chicago Dredging & Dock Co.
Griffith, McDermott & Watt
Dredging Co.
Duluth Dredge & Dock Co.

Contractors for

RIVER AND HARBOR IMPROVEMENTS.

Main Office: 1319-1322 Chamber of Commerce - CHICAGO

Buffalo Dredging Co.

GENERAL CONTRACTORS ON SUBMARINE WORK

Office
D. S. Morgan Bldg.

BUFFALO, N. Y.

Hickler Brothers

SAULT STE. MARIE, MICH.

MARINE RAILWAY

Capacity, 1,000 tons. Draft, 7½ ft.
forward, 13½ ft. aft. Length on
keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge,
Dredges, Drill Boats and Derrick Scows.

DUNBAR & SULLIVAN DREDGING CO.

BUFFALO, N. Y.

Will contract to remove ROCK or EARTH on the Great Lakes to 40 ft. depth.
To remove ROCK on Atlantic Coast to 40 ft. depth.

THAT'S ALL.

We SOMETIMES rent plant to responsible parties at OUR terms.

Dredges	Scows
Brian Boru, Steel.	Monroe Doctrine, 600 yds., Steel.
Tipperary Boy, Steel.	Protective Policy, 500 yds., Steel.
Erin Go Braugh.	Reciprocity, 600 yds., Steel.
Drill Boats	Cuba Libre, 250 yds., Steel.
Geo. A. Howells and	Gold Standard, 250 yds., Steel.
another, both Steel.	No. 5, 600
Tugs	No. 6, 600
Shaughraun, Steel	No. 7, 600
Phil. Sheridan, Steel	No. 8, 600
Spalpeen, Steel	
Paddy Miles, Steel	4,600
Shaun Rhue, Steel	McMyler derrick handling 10 tons
Derrick	at 75 ft. radius.
Faugh a Ballaugh	Small Scows

H. W. HUBBELL CO.

Submarine Work of all kinds

SAGINAW

MICH.

The Fitz-Simons & Connell Co.

CONTRACTORS FOR PUBLIC WORKS

DREDGING
DOCKS
PILE DRIVING
BREAKWATERS

TUNNELS
CANALS
BRIDGES
FOUNDATIONS

Offices: 1010-1014 Tacoma Building, Chicago.

Lake Superior Contracting & Dredging Company

GENERAL CONTRACTORS for PUBLIC and PRIVATE WORK RIVER AND HARBOR IMPROVEMENTS

Two 20-inch Hydraulic Dredges specially equipped
for handling Clay, Gravel and all kinds of dredgeable
material. Filling and reclaiming lands a specialty.

General Office, Wolvin Building

DULUTH, MINN

THE
L. P. & J. A. SMITH
COMPANY

CONTRACTORS FOR PUBLIC WORKS

Dredging	Dry Docks and	Bridges,
Harbor Work,	Pier Building,	Submarine
Pile Driving,	Railroads,	Foundations,
Breakwaters,	Canals,	Etc., Etc.

Offices: Williamson Bldg., CLEVELAND, O.

C. H. STARKE DREDGE & DOCK CO.,

Contractors for Public Works.

**DREDGING, PILE DRIVING,
AND
SUBMARINE PIPE LAYING.**

Canal Street, West of First Avenue,
Milwaukee, - - Wisconsin.

N. SULLIVAN,
DREDGING OF ALL KINDS.

THE REMOVING OF DEEP
WATER EARTH AND ROCK
A SPECIALTY. - - -

53 Woodward Ave. Terrace,
DETROIT, - - - MICH.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.



Fuel Scow with elevators and discharging spouts. Storage of 800 tons.
Discharges 250 tons an hour into steamers while unloading cargo.

M. A. Hanna & Co., Miners and Shippers,
Main Office, Perry-Payne Bldg., Cleveland.

J. RAYNER

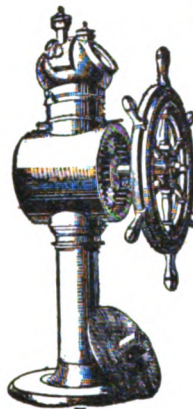
**MAHOGANY LUMBER
VENEERS
FOREIGN WOODS**

Foot E. Houston St.
NEW YORK CITY

Fulton & Morgan Sts.
CHICAGO

MARINE MFG. & SUPPLY CO.

157 and 158 South St., New York.



SHIP FITTINGS AND SUPPLIES

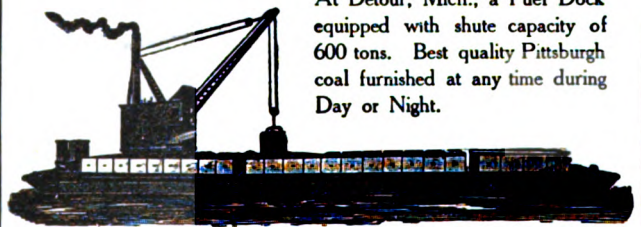
CAPSTANS, WINDLASSES,
STEERING APPARATUS, ENGINE
ROOM TELEGRAPHS, BRASS
AIR PORTS, DEAD LIGHTS,
PUMPS, ETC.

Catalogue A—Air Ports, Ventilators, etc.
Catalogue B—Windlasses, Pumps, etc.
Catalogue C—Steering Apparatus.
Others in course of preparation.

PICKANDS, MATHER & CO.

FUEL LIGHTERS at Buffalo, Erie, Ashtabula and Cleveland.

At Detour, Mich., a Fuel Dock
equipped with shute capacity of
600 tons. Best quality Pittsburgh
coal furnished at any time during
Day or Night.



Western Reserve Building,

CLEVELAND, O.

Toledo Office, 429 Spitzer Bldg.
Cleveland Office, 610 Perry-Payne Bldg.

Fueling { Ironville Dock (Toledo Harbor)
Plants { Huron Dock (Huron Harbor)

**THE IRONVILLE DOCK & COAL
COMPANY**

BITUMINOUS COAL

For Steamboat Fuel and Cargo Shipment

CLEVELAND, OHIO.

610 Perry-Payne Building

Bell Phone Main 572

Merchants Montreal Line

ST. LAWRENCE RIVER ROUTE
PASSENGER STEAMERS

CITY OF MONTREAL CUBA

Commencing June 15th, weekly service (Thursdays)
to the following points:

Toronto	Cornwall
Kingston	Prescott
Brockville	Montreal

For rates and further information apply to

G. E. JAKES & CO., Mgrs.
Montreal,
Quebec.

W. J. FARASEY, Agent,
107-115 River St.,
Tel. M 2049 Cleveland, O.



THE CLEVELAND & BUFFALO

TRANSIT COMPANY

UNPARALLELED NIGHT SERVICE

The Twin Flyers of The Lakes

"CITY OF BUFFALO" "CITY OF ERIE"

Both together being, without doubt, in all respects the finest and fastest that are run in the interest of the traveling public in the United States.

TIME CARD.—DAILY INCLUDING SUNDAY. CENTRAL STANDARD TIME.
Leave CLEVELAND 8 p. m. Arrive BUFFALO 6:30 a. m.
" BUFFALO 8 p. m. " CLEVELAND 6:30 a. m.

Connections made at Buffalo for all Eastern and Canadian points; at Cleveland for Toledo, Detroit and all points West and Southwest. Tickets reading over L. S. & M. S. Ry. will be accepted on this Company's Steamers without extra charge. Special Low Rates Cleveland to Buffalo and Niagara Falls every Saturday Night, also Buffalo to Cleveland. Ask Ticket Agents for tickets via C. & B. Line. Send four cents for illustrated pamphlet.

W. F. HERMAN, G. P. A., Cleveland, O.



DIXON'S GRAPHITE LUBRICANTS

ON SHIPBOARD ASSURE
NOTABLE RESULTS IN
ECONOMY AND EFFICIENCY
WHICH CANNOT
BE OTHERWISE SECURED

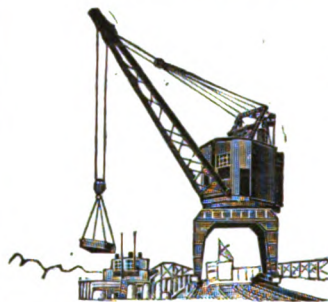
VALUABLE CATALOGUE No. 77-I FREE

JOSEPH DIXON CRUCIBLE CO.,
JERSEY CITY, N. J.

McMyler Mfg. Co.

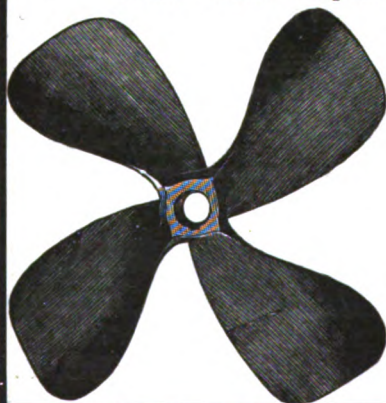
CLEVELAND, O., U. S. A.

Designers and Builders
of



Hoisting and Conveying
Machinery,
Vessel Unloading
Machinery,
Revolving Cranes,
Car Dumpers,
Clam Shell Buckets,
Etc.

Thirty Years' Experience building



Engines
and
Propeller
Wheels.

H. G. TROUT,
King Iron Works,
226 Ohio St.,
BUFFALO, N. Y.

Aids to Navigation

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

The Scherzer Rolling Lift Bridge Co.

Main Offices: 1616 Monadnock Block,
CHICAGO, U. S. A.

Sheriffs' Steam Steerer



FOR TUG BOAT USE

Easy to adjust, and can
be handled by any one.

MANUFACTURED BY

Sheriffs Mfg. Co.
MILWAUKEE, WIS.

Established 1854

SAFETY FIRE BUCKET TANK

An appliance that requires no attention—
Always ready for immediate use.

NOTHING TO GET OUT OF ORDER

A Chemical Solution that cannot

**FOUL, FREEZE
or EVAPORATE**

Indorsed by all Insurance Companies.

Used by

Penn. R. R. International Nav. Co.
Erie R. R. Hamburg Am. Line
C. R. R. of N. J. North German Lloyd

SAFETY FIRE EXTINGUISHER CO.
29 W. 42d St., New York.



WARD LINE

THE NEW YORK & CUBA MAIL
STEAMSHIP CO.

POPULAR ROUTE TO

CUBA, NASSAU, MEXICO

FINEST AND LARGEST STEAMSHIPS SAILING
FROM NEW YORK TO OTHER THAN EUROPEAN
PORTS. HOLDERS OF THE RECORD BETWEEN
HAVANA AND NEW YORK -- 1,240 MILES IN 61
HOURS.

FOUR SAILINGS EACH WEEK BETWEEN
NEW YORK and HAVANA.

WEEKLY SERVICE TO GUANTANAMO, SANTIAGO, MANZANILLO
AND CIENFUEGOS, CUBA, PROGRESO, VERA CRUZ
AND TAMPICO, MEXICO.

SEMI-MONTHLY SAILINGS TO
Nassau, N. P. Bahamas.

LOW RATES OF FREIGHT AND PASSAGE.

SEND FOR OUR SCHEDULES, RATES AND DESCRIPTIVE MATTER.

James E. Ward & Co.

GENERAL AGENTS

90 Wall Street, NEW YORK.

AMERICAN LINE

PLYMOUTH
CHERBOURG
SOUTHAMPTON

Sailing From New York Every Saturday at 9:30 a. m.

St. Louis
(11,629 tons)
New York
(10,788 tons)

St. Paul
(11,629 tons)
Philadelphia
(10,788 tons)

Special Express Train from Plymouth and Southampton
to London and between Cherbourg and Paris.

RED STAR LINE

NEW YORK
ANTWERP
LONDON
PARIS

CALLING AT DOVER FOR LONDON AND PARIS.
Sailing Every Saturday at 10:30 a. m.

Finland
(12,760 tons)

Kroonland
(12,760 tons)

Vaderland
(12,017 tons)

Zeeland
(11,905 tons)

One of the Shortest Routes to LONDON, PARIS, BELGIUM, HOL-
LAND, GERMANY, THE RHINE, SWITZERLAND and ITALY.

9 Broadway, New York.

Broad and Sansom Sts., Philadelphia.
India Building, 84 State Street, Boston.
1306 F St., N. W., Washington, D. C.
219 St. Charles St., New Orleans
90-96 Dearborn St., Chicago.
Century Building St., Louis.
Guaranty Building, S., Minneapolis.
21 Post St., San Francisco.
375 Robert St., St. Paul.
41 King St., East Toronto.
17 St. Sacramento St., Montreal.

PIERS: 14 & 15 NORTH

RIVER, FOOT OF FUL-

TON ST., NEW YORK.

United Fruit Co's Steamship Lines

CARRYING FAST UNITED STATES AND FOREIGN MAILS.

First-Class Passenger Service to Jamaica

Weekly Sailings from

BOSTON, PHILADELPHIA and BALTIMORE

Fare One Way, \$40.00—Round Trip, \$75.00

For full information apply to
DIVISION PASSENGER AGENT
At either port.

"MALLORY LINE"

(New York & Texas Steamship Company)

Steamers Leave Piers New 15, 16 East River, NEW YORK

For GALVESTON, TEXAS

Every WEDNESDAY and SATURDAY, taking FREIGHT for all Points in
TEXAS, MEXICO, NEW MEXICO, ARIZONA, UTAH, KANSAS, OKLA-
HOMA, MISSOURI, COLORADO and CALIFORNIA.

Saturday's Steamer touches at Key West, Fla.

For MOBILE, ALA.

A Steamer sails every FRIDAY, 3 p. m., taking FREIGHT for ALABAMA,
MISSISSIPPI, MISSOURI and the SOUTHWEST.

For BRUNSWICK, GA.

A Steamer sails every FRIDAY, 3 p. m., taking FREIGHT for all Points in
GEORGIA, FLORIDA, ALABAMA, LOUISIANA and the SOUTH and
SOUTHWEST.

PASSENGER DEPARTMENT

Six days Ocean voyage to GALVESTON, Texas, thence by rail to All points
South-west. Six days to MOBILE, Ala., through tickets to NEW
ORLEANS. 65 hours to BRUNSWICK, Ga., thence rail to Interior South-
eastern Points.

An especially attractive route through famous "SEA ISLANDS" to
JACKSONVILLE, Florida.

Through Bill of Lading. Insurance at lowest rates.

C. H. MALLORY & CO., General Agents,
129 Front Street Branch Office, 385 Broadway, New York.

BOSTON STEAMSHIP CO.

S. S. "SHAWMUT" S. S. "TREMONT" S. S. "LYRA"

Japan, South China and Manila Steamship Line

Operated in connection with the

Northern Pacific and Great Northern Railway Companies,

Monthly Passenger and Freight Service from
Tacoma and Seattle, Washington.

New Twin-screw American Steamships of
10,000 tons register. Exceptionally large
staterooms, all outside.

OWING TO THE GREAT SIZE OF THE SHIPS,
AND THE IMMENSE CARGOES CARRIED IT HAS
NEVER BEEN NECESSARY TO USE RACKS ON
THE DINING TABLES.

Rates at any office of

NORTHERN PACIFIC RAILWAY,
GREAT NORTHERN RAILWAY,
CHICAGO, BURLINGTON & QUINCY RAILWAY,
THOMAS COOK & SONS, Tourists Agents.

A. WINSOR, PRES.
Boston, Mass.

F. WATERHOUSE, AGENT,
Seattle, Wash

VESSEL AND INSURANCE AGENTS.

FRED P. BELCHER,
Vessel and Insurance Agent,
430 Grain Exchange,
WINNIPEG, MAN.
P. O. Box 230.

JOHN J. BOLAND & CO.,
Vessel and Insurance Agents.
800-804 Prudential Bldg.
Both Phones. BUFFALO, N. Y.

C. W. Elphicke. J. J. Rardon.
C. W. ELPHICKE & CO.
Vessel and Insurance Agents.
No. 6 Sherman St. CHICAGO, ILL.
Telephone, Harrison 1194.

E. J. FLEMING & CO.
Vessel and Insurance Agents.
24-25 No. 6 Sherman St., CHICAGO.
Office: Residence:
Tel., Harrison 4975. Tel. Drexel 1736.

C. P. GILCHRIST & CO.
Vessel and Insurance Agents.
Sale and Exchange of Vessels a Specialty.
Lumber and Coal Chartering.
Full Telephone Service, Office and Residence. (Local and Long Distance.)
411 Perry-Payne Bldg., Cleveland, O.

JOHN B. HALL,
Vessel Agent.
17 Exchange Bldg., 202 Main St.,
Telephone, Seneca 892.
BUFFALO, N. Y.

W. A. Hawgood. Arthur H. Hawgood.
W. A. HAWGOOD & CO.
Vessel and Insurance Agents.
220-21 Perry-Payne Bldg., Cleveland, O.
Office, Main 2395.
Telephones: { Res. W. A. Hawgood, Doan 84-J.
{ Res. A. H. Hawgood, Doan 841-J.

D. T. HELM & CO.
Vessel and Insurance Agents.
Telephones—Office 263.
—Res. 381-3.
DULUTH, - - - MINN.

SAMUEL HOLMES,
Steamship Offices,
For Selling, Chartering and Building all
Classes Steam Vessels.
Steam Vessel Circulars.
Weekly Freight Circulars.
Morris Bldg., 66-8 Broad St., New York.

C. L. Hutchinson. W. H. McGean.
HUTCHINSON & CO.
Vessel and Insurance Agents.
Office, Main 2453.
Phones: { Res. C. L. Hutchinson, Lake 244.
{ Res. W. H. McGean, Doan 274.
1408 Rockefeller Bldg. Cleveland.

VESSEL AND INSURANCE AGENTS.

S. S. LESTER,
Steamship Agent and Freight Broker.
Manager Steamer
ST. LAWRENCE,
83 Dalhousie St. QUEBEC, QUE.

T. R. MCCARTHY,
Steamship and Freight Broker.
Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.
Cable Address, "Macarthy, Montreal."
(Watkins', Scott's Liebers and A. B. C. Codes Used.)
Shipping Agent to The Asbestos & Asbestic Co., Ltd., of Danville, Que. The Belgo Canadian Pulp & Paper Co., Ltd., of Shawinigan Falls, Que. Edward Lloyd, Ltd. Paper Manufacturer, of London (Eng.).
404 Board of Trade Bldg., MONTREAL, CAN.
Correspondence Invited and Agencies Solicited.

J. Mitchell. J. F. Wedow. A. Mitchell.
MITCHELL & CO.
Vessel and Insurance Agents.
508-10 Perry-Payne Bldg., Cleveland, O.
Office Tel. M. 767. Res. John Mitchell,
Doan 341.
John F. Wedow, Doan 141-J.
Alfred Mitchell, Doan 218.

PARKER BROS. CO., LTD.,
Vessel, Marine Insurance and Wrecking Agents. Marine Surveyors.
Office Tel. Main 5314. Night: Main 290
Night: Grand 1723 J.
15 Atwater St. West, DETROIT, MICH.

Insurance.
PRINDIVILLE & COMPANY,
Average Adjusters.
Insurance Brokers.
12 Sherman Street, CHICAGO.
Representing: Johnson & Higgins, New York.

W. C. RICHARDSON,
Vessel Owner and Broker and
Marine Insurance Agent.
420-421 Perry Payne Building,
CLEVELAND, O.
Office Tel. 338. Residence Tel. 2938.

D. Sullivan. F. J. Sullivan.
D. SULLIVAN & CO.
Vessel Agents.
Marine Insurance.
2-4 Sherman St., CHICAGO, ILL.
Office Tel., Harrison 2847. Res. Ashland 2483.

NAVAL ARCHITECTURE,
by
THOS. H. WATSON.

A manual on laying off iron and steel vessels. Valuable for naval architects as well as beginners in ship yards.

Price, \$5.00.
Order from
THE PENTON PUB. CO.,
Cleveland, O.

PROCTORS IN ADMIRALTY.

WILLIAM F. CARROLL,
Lawyer and Proctor in Admiralty
Twenty years' general practice State and
Federal Courts, Minnesota, New
York and Illinois.
613-59 Dearborn St. Chicago, Ill.
Phone 4232 Central.

ALBERT J. GILCHRIST,
Proctor in Admiralty.
604 Perry-Payne Building,
CLEVELAND, O.

GOULDER, HOLDING & MASTEN,
Law Offices.
H. D. Goulder. S. H. Holding. F. S. Masten.
Perry-Payne Building,
CLEVELAND, O.

HOYT, DUSTIN & KELLEY,
Lawyers and Proctors in Admiralty.
Offices, 702 Western Reserve Bldg.,
CLEVELAND, O.

JENKINS, RUSSELL
& EICHELBERGER,
Attorneys-at-Law
and Proctors in Admiralty.
1520 Rockefeller Bldg. CLEVELAND.

C. E. KREMER,
Counselor at Law and
Proctor in Admiralty.
Suite 821-822 New York Life Bldg.
CHICAGO, ILL.

RAY G. MACDONALD,
Attorney-at-Law and
Proctor in Admiralty.
1018 Hartford Building,
Telephone, Central 2484 CHICAGO, ILL.

SHAW, WARREN, CADY & OAKES,
Attorneys-at-Law.
and Proctors in Admiralty.
Union Trust Bldg., Detroit, Mich.

WHITE, JOHNSON,
McCASLIN & CANNON,
Attorneys-at-Law and
Proctors in Admiralty.
Williamson Bldg., CLEVELAND, O.

MARINE INSURANCE,
by
WILLIAM GOW.
Price, \$1.50.
THE PENTON PUB. CO.,
Cleveland, O.

PROFESSIONAL.

ROBERT W. HUNT & CO.,

*Bureau of Inspection.
Tests and Consultation.*

1121 The Rookery, CHICAGO.
Monong. Bank Bldg., PITTSBURG.
66 Broadway, NEW YORK.

Inspectors of shipbuilding material and machinery. Inspectors of all materials. Duty tests of engines and boilers. Physical and chemical laboratories.

PROFESSIONAL.

James Nacey.

Alexander Hynd.

NACEY & HYND,
*Marine Architects.
Mechanical Draughtsmen.
Consulting Engineers.*

Specifications and designs for all descriptions of marine vessels, engines and boilers. Supervision of construction and repairs. Damage and other surveys carefully attended to.

Agents for Marine Specialties.

208-9 Western Reserve Building,
CLEVELAND, O.
Phone, Main 3339 J.

PROFESSIONAL.

W. J. WOOD,

Naval Architect, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

FIRE BOATS A SPECIALTY.

Complete Plans furnished for Steel, Composite or Wooden Vessels.

921 Postal Telegraph Bldg.
Tel. Harrison 1020. CHICAGO.

JOSEPH KIDD,

*Marine Architect and Surveyor.
Consulting Ship Builder and Engineer*

Over thirty years' experience. Specifications, designs and estimates. Superintendence of construction and repairs. Damage and other surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade,
DULUTH, MINN.

**HAND BOOK
OF
ADMIRALTY LAW,**
by
ROBT. M. HUGHES,
Price \$3.75.
THE PENTON PUB. CO.,
Cleveland, O.

**JUST PUBLISHED
CLASS BOOK OF
NAVAL ARCHITECTURE**

BY W. J. LOVETT
Illustrated Price \$2.50
Order from Marine Review, Cleveland.

**NAVAL ARCHITECTS' AND
ENGINEERS' DATA BOOK,**

By T. H. WATSON.
Price, \$1.50.
THE PENTON PUB. CO.,
Cleveland, O.

BRITISH ADMIRALTY CHARTS

The latest Editions of Charts, Plans and Sailing Directions published by the British Admiralty. Can be obtained from Admiralty Agent by Appointment.

J. D. POTTER,

145 MINORIES
LONDON, ENGLAND

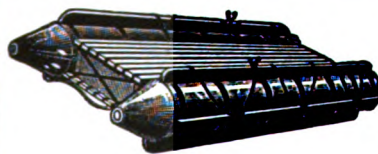
OFFICIAL CATALOGUE
OF CHARTS (880 pages) 1s.

An abridged Catalogue of Charts of
Nautical Books (free on application.)

HOISTING ENGINES.

We build them in all sizes from new and improved designs. Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a hoist for marine work, dock work, mining, or any other purpose, kindly permit us to name you prices. We know we can please you.

MARINE IRON CO., - - - Bay City, Mich.



THOS. DREIN & SON

BUILDERS of Metallic Life Boats and Rafts, Government and Pleasure Boats, Block and Granulated Cork Life Preservers. Outfits for Lake Steamers a specialty. Tattall St. below Railroad.

WILMINGTON, DEL.

John Donnelly, Sr., Pres.
H. B. Folger, Treas.

John Donnelly, Jr., Vice-Pres.
Thos. Donnelly, Secy.

**THE
DONNELLY SALVAGE & WRECKING CO., LTD.**
KINGSTON, ONT.

DIVERS, STEAM PUMPS, TUGS, ETC.
SUPPLIED ON SHORTEST NOTICE.

THE "GAYNOR"

Improved Cork Block Life Preservers

Wired and unwired. The new standard preservers. Best on the market. Unrivalled in reliability, construction, strength, quality and durability of materials. Approved by the Board of Supervising Inspectors of the Steamboat Inspection Service, at its meeting in Washington, D. C. December, 1904.

Manufactured by THE NATIONAL CORK CO.

261 Lorimer St., Brooklyn, N. Y.

Who will send circulars and prices. Or write to
T. F. GAYNOR, 18 Broadway, N. Y., for particulars.

**PATTERSON'S NAUTICAL
ENCYCLOPEDIA**

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

PRICE, \$3.00

THE MARINE REVIEW

CLEVELAND

**HAWKINS' WORKS FOR
ENGINEERS**

Popular among young men in the engine departments of ships is "Engineers' Examinations with Questions and Answers" Sells at \$2.00, which is the cost delivered, of the following works:

Hawkins' New Catechism of Electricity.
Hawkins' Maxims and Instructions for the Boiler Room.
Hawkins' Hand Book of Calculations for Engineers.
Hawkins' New Catechism of the Steam Engine.

THE MARINE REVIEW, CLEVELAND.

GREAT LAKES REGISTER

FOR THE
CLASSIFICATION OF STEEL AND WOODEN VESSELS.



Estb. 1828 Estb. 1898
COMBINED AND ISSUED IN CONNECTION WITH
BUREAU VERITAS
INTERNATIONAL REGISTER OF SHIPPING.

THE RATINGS OF GREAT LAKES REGISTER GO BEFORE AND ARE ACCEPTED BY THE LEADING UNDERWRITERS OF AMERICA AND EUROPE. VESSELS BUILT UNDER THE SUPERVISION OF ITS SURVEYORS WILL RECEIVE SPECIAL RATING, AND WILL ALSO BE PUBLISHED IN BUREAU VERITAS INTERNATIONAL REGISTER OF SHIPPING.

PLANS AND SPECIFICATIONS FURNISHED.

GREAT LAKES REGISTER SURVEYORS ARE ESTABLISHED AT ALL THE PRINCIPAL PORTS ON THE GREAT LAKES.

F. D. HERRIMAN, SURVEYOR GENERAL,
820-822 Perry-Payne Building, CLEVELAND, O.

FORE RIVER SHIPBUILDING CO.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

- U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
- U. S. Protected Cruiser Des Moines.
- U. S. Battleships New Jersey and Rhode Island.
- U. S. Steam Light-Vessel No. 72.

Office and Works, QUINCY, MASS., U. S. A.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Sts., HOBOKEN, N. J.

Take Ferry from foot of West 22nd St., New York.

The Atlantic Works, EAST BOSTON, Massachusetts.

BUILDERS OF

Steamships, Steam Yachts, Tow Boats, Etc.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Work.
THREE MARINE RAILWAYS.

THE SHIPOWNERS DRY DOCK CO.

CHICAGO, ILL.

Building and Repairing of Steel and Wooden Ships with economy and dispatch.

Yard and Dry Docks: Halstead St. and North Branch.
Largest Dry Dock: 480 ft. on keel blocks.

Office, 381 No. Halstead St. Phone, North 1658.

CHARLES E. PECK.

WILLIAM A. PRIME.

CHAS. E. & W. F. PECK,

Insurance Brokers. Average Adjusters.

ESTABLISHED 1870.

NEW YORK, 58 William Street.

BOSTON, 153 Milk St.

BUFFALO, 906 The Fidelity Bldg.

CLEVELAND, 1107-8 Williamson Bldg.

CHICAGO, 1115-16 Royal Insurance Bldg.

REPRESENTED BY

C. T. BOWRING & CO., (Insurance) LTD.,

5 and 6 Billiter Ave., LONDON,
and at "LLOYD'S" LONDON.

HULLS and CARGOES.

We place insurances in the most advantageous markets, employing, in the interest of our clients and with equal facility, all Foreign and Home companies, at the best procurable rates and terms.

We Represent Only the Assured.

CRANE VALVES

ESTABLISHED 1855

CRANE FITTINGS

GEO. STRATFORD OAKUM CO.

JERSEY CITY, NEW JERSEY.

Established
1880



Manufacturers
of all grades of

Oakum

Spun
Cotton

FOR SALE AT SHIP CHANDLERS EVERYWHERE.

The Martin-Barriss Co.

654 Seneca Street CLEVELAND, OHIO

IMPORTERS AND MANUFACTURERS OF

MAHOGANY
WHITE MAHOGANY

and all Native Cabinet Woods

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim
WHITE OAK TIMBERS AND PLANK
Constantly on Hand and Sawed to Order on Short Notice



1905

Tenth Annual Edition.

Not in Any Other Book—The mailing lists and statistics published in the BLUE BOOK OF AMERICAN SHIPPING. The index will refer you to the page which contains just what you are looking for, if it has anything to do with Marine affairs.

Names and addresses of everyone you will want to reach.

Five hundred pages 10 x 7". Price \$5.00, prepaid.

The Penton Publishing Co.
Cleveland.

NINETEENTH ENLARGED EDITION; OVER 1,400 PAGES.

THE SHIPPING YEAR BOOK WORLD 1905

EDITED BY MAJOR JONES AND A STAFF OF EXPERTS.

The Work Embraces { I.—Customs Tariffs of All Nations.
II.—A Port Directory of the World.
III.—Board of Trade Rules and Regulations.
IV.—Load Line Tables, Sailing Rules, Lights, Signals.
V.—Digest of Shipping Laws. Much other Useful Information

A LARGE MAP OF THE WORLD, especially designed by J. G. Bartholomew, F. R. G. S., F. R. S. E., is supplied in a pocket in the cover. Introduced by a RETROSPECTIVE VIEW of 1904.

Crown 8vo., cloth. Price, post free: In the United Kingdom, 5s; foreign countries, 6s, except in the United States where the Sole Agents for 1905 are

THE DERRY-COLLARD CO., 256-7 Broadway, NEW YORK.

THE TIMES.—"The information given is wide in scope, and varied in matter, dealing with almost every subject of interest connected with trade, commerce, and navigation. About one-third of the volume is devoted to the tariffs of all nations, which are given in full."

DAILY TELEGRAPH.—"A more comprehensive handbook in its special line for the merchant's desk there could scarcely be."

NEW YORK TRIBUNE.—"This compact book of upwards of twelve hundred pages, published by 'The Shipping World,' of London, contains an immense amount of information of value to the mariner and shipper."

PALL MALL GAZETTE.—"The Shipping World Year Book" would be very much missed if it failed to put in a regular appearance, but fortunately there is no danger of that. The comprehensive retrospect of shipping affairs deserves special attention, and will repay careful study."

GLASGOW HERALD.—"The book more than ever commands the confidence of those large mercantile classes who have been accustomed to consult its pages for world-wide information, and always with success."

NEWCASTLE CHRONICLE.—"Those who refer to it will find all matters appertaining to the business of the shipowner brought right up to date."

LIVERPOOL JOURNAL OF COMMERCE.—"Filled from cover to cover with information absolutely indispensable to all engaged in the over-sea commerce of this country."

TIMBER.—"There is not another book of its size in the world which contains so much information worth having."

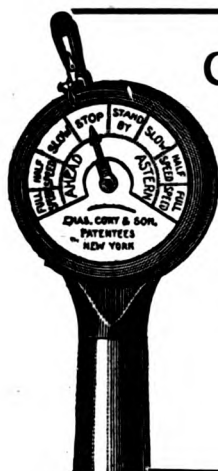
SOUTH WALES DAILY NEWS.—"Major Jones, the capable editor, has anticipated the public attention now being devoted to tariffs, and those of all nations and of the Colonies have been included and revised up to the last hour of publication."

THE SHIPPING WORLD OFFICES, Effingham House, Arundel-street, Strand, London, W. C.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.
The dagger (†) indicates that advertisement appears once a month.

Almy Water Tube Boiler Co. 41	East End Boiler Works. 41	Lake Superior Contracting & Dredging Co. 42	Raynor, J. 43
American Industries. 3	Elphicke, C. W. & Co. 46	LeMois Scientifique et Industriel * 46	Red Star Line. 45
American Injector Co. 9	Falls Hollow Staybolt Co. 37	Lester, S. S. 46	Richardson, W. C. 46
American Line. 45	Fitz-Simons & Connell Co. 42	Link Belt Machinery Co. †	Ritchie & Sons, E. S. *
American Ship Building Co. 45	Fix's Sons, S. 50	Lockwood Mfg. Co. 50	Roberts Safety Water-Tube Boiler Co. 11
American Ship Windlass Co. 52	Fleming & Co., E. J. 46	"Long Arm" System Co. †	Rosker, H. B. 50
Armstrong Cork Co. 48	Fletcher Co., W. & A. 48	Lunkenheimer Co. 11	Ross Valve Co. 50
Ashton Valve Co. 35	Fogg, M. W. 50	McCarthy, T. R. 46	Safety Car Heating & Lighting Co. 5
Atlantic Works. 48	Fore River Shipbuilding Co. 48	McCurdy, Geo. L. 35	Safety Fire Extinguisher Co. 44
Atlantic Works, Inc. †	Gaynor, T. F. 47	McMyler Mfg. Co. 44	Scherzer Rolling Lift Bridge Co. 44
Baker, Howard H. & Co. 52	General Electric Co. 52	MacDonald, Ray G. 45	Schrader's Son, A. 50
Belcher, Fred P. 46	Gilchrist, Albert J. 46	Mallory Line. 47	Shaw, Warren, Cady & Oakes. 46
Boland, J. J. 46	Gilchrist & Co., C. P. 46	Marine Iron Co., Bay City, Mich. 3	Shelby Steel Tube Co. 44
Bonner & Co., Wm. T. †	Goulden, Holding & Masten. 46	Marine Iron Works. 3	Sheriffs Mfg. Co. 44
Boston & Lockport Block Co. 2	Great Lakes Dredge & Dock Co. 42	Marine Mfg. & Supply Co. 43	Shipping World. 49
Boston Steamship Co. 45	Great Lakes Engineering Works. 12	Martin-Barriss Co. 48	Shipowners' Dry Dock Co. 48
Bourne-Fuller Co. 35	Great Lakes Register. 48	Maryland Steel Co. 10	Smith Coal, L. P. & J. A. 43
Bowers, L. M. & Co. 41	Great Lakes Towing Co. 9	Merchants' Montreal Line. 44	Smith Coal & Dock Co., Stanley B. 37
Breyman & Bros., G. H. 42	Greacen-Derby Engineering Co. †	Mietz, Aug. †	Smith, Stanley B. & Co. 37
Brown Hoisting Machinery Co., Inc. 2	Hall, John B. 46	Milwaukee Dry Dock Co. 5	Smooth-On Mfg. Co. 51
Buffalo Dredging Co. 42	Hanna & Co., M. A. 43	Mitchell & Co. 46	Standard Oil Co. *
Buffalo Dry Dock Co. 5	Hawgood & Co., W. A. 46	Morse & Son, A. J. 50	Starke Dredge & Dock Co., C. H. 43
Bunker, Edw. A. 51	Helm & Co., D. T. 46	Mosher Water-Tube Boiler Co. 41	Stirling Co. *
Carroll Wm. F. 46	Hickler Bros. 42	Moulton Steering Engine Co. 50	Stratford Oakum Co., Geo. 48
Chase Machine Co. 11	Holmes, Samuel. 46	Nacey & Hynd. 47	Sturtevant, B. F. Co. 52
Chicago Ship Building Co. 4	How, Benj. V. 52	National Cork Co. 47	Sullivan, M. 43
Cleveland & Buffalo Trans. Co. 44	Hoyt, Dustin & Kelley. 46	Newport News Ship Building & Dry Dock Co. 6	Sullivan & Co. 46
Cleveland City Forge & Iron Co. 51	Hubbell Co., H. W. 42	New York & Cuba Mail S. S. Co. 45	Superior Ship Building Co. 4
Continental Iron Works. 2	Hunt & Co., Robert W. 47	New York Shipbuilding Co. 7	Sutton Co., C. E. 50
Cory, Chas. & Son. 50	Hutchinson & Co. 46	Nicholson Ship Log Co. *	Taylor Water-Tube Boiler Co. 41
Craig Ship Building Co. *	Hyde Windlass Co. 3	Northwestern Steam Boiler & Mfg. Co. 41	Thropp, J. E. & Sons Co. 41
Cramp, Wm. & Sons, S. & E. B. Co. 8	International Mercantile Marine Co. 45	Otis Steel Co. 3	Tietjen & Lang Dry Dock Co. 50
Crandon & Son, H. I. 37	Ironville Coal and Dock Co. 43	Parker Bros. Co. 46	Trout, H. G. 44
Crane Co. 48	Jenkins Brothers. 52	Parsons, Ralph M. †	Truscott Boat Mfg Co. 3
Dearborn Drug & Chemical Wks. 9	Jenkins, Russell & Eichelberg. 46	Peck, Chas. E. & W. F. 48	United Fruit Co. 45
Dearing Water Tube Boiler Co. 11	Kahnweiler's Sons, David. 51	Penberthy Injector Co. *	Upson-Walton Co. 52
Delaunay, Belleville & Co. 35	Katzenstein & Co., L. 51	Pickands, Mather & Co. 43	Walker, Thomas & Son. 2
Delaware River Iron S. B. & E. Works. 51	Kidd, Joseph. 47	Pittsburg Coal Co. 9	Ward Line. 45
Detroit Ship Building Co. 4	Kieley & Mueller. 2	Potter, J. D. 47	Watson-Stillman Co. 51
Dixon Crucible Co., Joseph. 44	Kingsford Foundry & Machine Works. 41	Power Specialty Co. *	White, Johnson, McCaslin & Cannon. 46
Donnelly Salvage & Wrecking Co. 47	Kremer, C. E. 46	Prindiville & Co. 46	Wood, W. J. 47
Drein, Thos. & Son. 47		Quintard Iron Works Co. 50	Woodhouse Chain Works. 7
Dunbar & Sullivan Dredging Co. 42			



Chas. Cory & Son

Manufacturers of

Mechanical and Electrical
Telegraphs and Indicators.
Engine Bells and Electric
Call Bells.

278-279 Division St.
NEW YORK CITY.

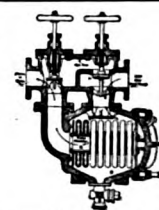
Water Filters, Regulators and Engines.

We make **Pressure Regulating Valves** for all purposes, steam or water.

Our **Feed-Water Filter** will keep oil out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs.



Keep Oil out of your Boiler with the **Feed-Water Filter** For Marine and Land Service. Two of these Filters are in use on the Oceanic.

THE **ROSS VALVE CO.** TROY N. Y.

Tietjen & Lang Dry Dock Co.

HOBOKEN, N. J.

EIGHT DRY DOCKS

600, 800, 1,000, 1,200, 1,400, 1,800, 2,000, 10,000 TONS

General Repairs on Wooden and Iron Vessels

FT. OF 17th STREET

Telephone 700 Hoboken

HOBOKEN, N. J.

The Lockwood Manufacturing Co.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of Steamships, Tow Boats and Marine Engines.

Repairing of Hulls and Machinery.

Quintard Iron Works Company

Office 742 E. 12th St., NEW YORK.

Manufacturers of

MARINE ENGINES, BOILERS, ETC.

Gas Works Apparatus. Sugar, Cement, Mining, Dredging and all kinds of machinery

N. F. PALMER, *President* STEVENSON TAYLOR, *Vice Pres.*
GEO. Q. PALMER, *Treas. and Gen. Mgr.*

The C. E. Sutton Company

Toledo, Ohio, U. S. A.

Manufacturers of

PUNCHES and SHEARS, FORGING MACHINES, STEEL and IRON GREY CASTINGS

Marine Castings a Specialty

THE ALLEN DENSE-AIR ICE MACHINE

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers. A hundred are in daily service on steamers.

H. B. ROELKER, 41 Maiden Lane, NEW YORK.

Consulting and Constructing Engineer.

Designer and Manufacturer of Screw Propellers.



Established 1844
A. SCHRADER'S SON, Inc.
32 Rose Street, NEW YORK

Manufacturer of

Submarine Armor and Diving Apparatus

We carry a complete stock of Dresses, Hose and Repair Sundries.

Improved Bolt Helmet All orders filled day received Write for our prices

M. W. FOGG

**Mattresses
and Cushions**



202 Front St.

NEW YORK CITY.

ORAM FIX

ESTABLISHED 1860

J. W. FIX

S. FIX'S SONS

SUCCESSORS TO S. FIX & SON.

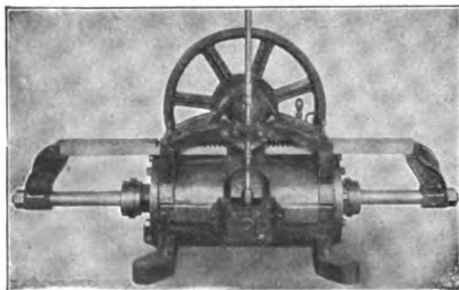
Steam Flue Welding Works

Our work stands government test. Our Welds are perfectly smooth. Write us for prices.

COR. LEONARD AND WINTER STS

CLEVELAND, O.

A STEAM STEERER DIRECT AND POSITIVE



QUICK ACTING
Especially adapted for
Steam Yachts
Ferryboats
Lake, Ocean
and Harbor
Tug Boats.

Send for Catalogue and Particulars.

MOULTON STEERING ENGINE CO., 1691 BROADWAY
NEW YORK CITY.



WATSON-STILLMAN HYDRAULIC JACKS

THINK of the work you expect a Hydraulic Jack to do if it's going to be any good to you—to lift and carry for an indefinite period, a load that nothing but a good Hydraulic Jack can stand under.

Then ask yourself if such loads should be imposed on anything but the very best of workmanship and materials.

We took this into consideration in rejecting so-called seamless tubing for

WATSON-STILLMAN HYDRAULIC JACKS

and make rams and cylinders from solid steel billets.

The jacks we build can be trusted, absolutely, and we furnish them in 300 styles suited for every purpose.

Send for Jack List, Edition "N."

WATSON-STILLMAN CO.

Offices: **46 Dey Street, NEW YORK**
453 The Rookery, CHICAGO



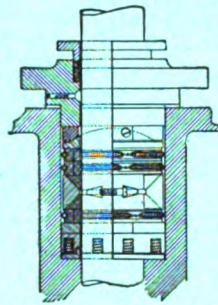
ROACH'S SHIP YARD.



Ship
Building
in all its
Branches

Builders of
STEAMSHIP AND MARINE MACHINERY.

Delaware River Iron Ship Building & Engine Works,
Chester, Pa.



Katzenstein's Self- Acting Metal Packing

For PISTON RODS, VALVE STEMS, etc. of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries.

FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also **METAL GASKETS** for all kinds of flanges and joints.

For full particulars and reference, address

L. KATZENSTEIN & CO.

GENERAL MACHINISTS, BRASS FINISHERS, ENGINEERS' SUPPLIES.
358 West street, New York.

Neversink Cork Jackets and Life Belt

Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

Safest Consolidated Cork Life Preservers. Cheapest

Ring Buoys and Fenders.
Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.



**Metallic and
Wooden
Life Boats.**



Metallic Life Rafts. Marine Drags.

Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS,

**Fox Building, Cor. Franklin Sq. and Dover Street,
NEW YORK CITY.**



**LIGHT
STRONG
DURABLE**

**CLOTH
THAT'S IN
DEMAND**

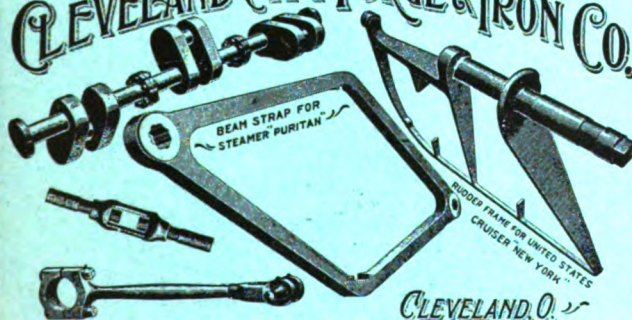
Wilford's Waterproof Cloth is made of twisted pure flax thread. It is pliable—will not crack, and much stronger than cotton. Impenetrable by salt or fresh water. Suitable for Tarpaulins, sail, hatch or boat covers, etc. A superior waterproof cloth. Test its merits.

EDWARD A. BUNKER

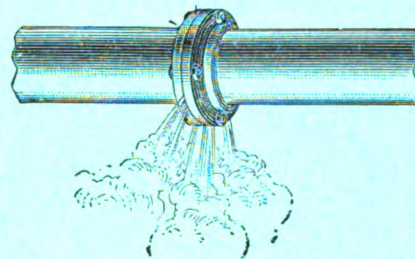
Sole Agent for the United
States and Canada

P. O. BOX 1579, NEW YORK

CLEVELAND CITY FORGE & IRON CO.



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.



Smooth-On
Elastic
Cement
will stop leaks

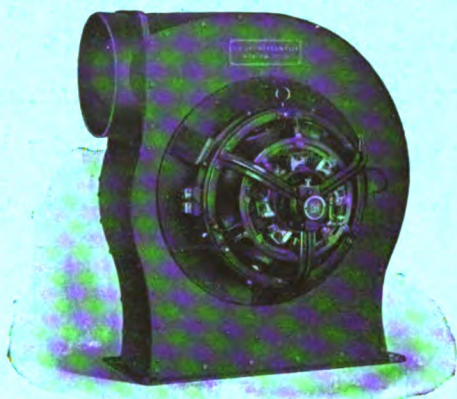
Write for new instruction book

SMOOTH-ON MFG. CO.

JERSEY CITY, N. J., U. S. A.

LIKE THE PAINTER

who mixed his paint with brains, we build a good blower and then spare neither time or engineering experience in so applying it as to give the very best results.



B. F. STURTEVANT CO.,

Boston, Mass.

General Office and Works, Hyde Park, Mass.
New York Philadelphia Chicago London

Designers and Builders of Heating, Ventilating, Drying and Mechanical Draft Apparatus; Fans, Blowers and Exhausters; Steam Engines, Electric Motors and Generating Sets; Fuel Economizers; Forges, Exhaust Heads, Steam Traps, Etc.

510

Jenkins Bros. "Y" or Blow-Off Valves



As these valves have a full opening nearly in line with the pipe, they offer little resistance to the flow of steam or fluids. They are especially adapted for use where the unobstructed flow of thick fluids is required, and as Blow-off Valves for boilers they have no superior.

Made screwed or flanged, in brass and iron body.

Send for Booklet, "VALVE TROUBLES AND HOW TO AVOID THEM."

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

6

General Electric Company

Original designers
of marine
generating sets.

Principal Office: SCHENECTADY, N. Y.

Sales offices in
all large cities.

634

ARBECAM'S ALIDADE

Adjustable Compass
Deviation Corrector

Position and Distance Finder.



A Modern Necessity on Ship Board.

BENJAMIN VARNUM HOW

BOSTON, MASS.

General Agent.

LIFE PRESERVERS—BUOYS

ACME. S. L. CORK. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed.

Orders filled promptly.

ARMSTRONG CORK COMPANY

Boston New York Philadelphia Pittsburg
Chicago St. Louis Baltimore

HOWARD H. BAKER & CO. SHIP CHANDLERS and SAIL MAKERS

18 to 26 Terrace.

BUFFALO, N. Y.



TENTS,
SAILS,
AWNINGS
AND
BUNTING
of every
Description.

We are among the largest manufacturers in the country of
canvas goods.

The UPSON-WALTON Co.,
CLEVELAND, O.